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HERINGIA SENILIS SACK (DIPTERA: SYRPHIDAE): A HOVERFLY NEW TO BRITAIN

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Abstract. *Heringia senilis* Sack, a hoverfly new to the British list, is reported. Adults were reared from larvae found inhabiting the spiral leaf-petiole galls on Lombardy poplar trees, formed by colonies of the aphid *Pemphigus spyrothecae* (=*spirothecae*) Passerini, in Forster Memorial Park, Catford, south-east London. Its problematic distinction from *H. heringi* (Zett.) is discussed.

INTRODUCTION

On 30.ix.1999 I was examining the characteristic spiral galls, caused by the communal aphid *Pemphigus spyrothecae* (=*spirothecae*) Passerini, on the leaf petioles of Lombardy poplars in Forster Memorial Park, Catford, south-east London, TQ3872. My thoughts were for the predatory bug *Anthocoris minki* Dohrn, known to occupy these galls. The bug was indeed present, much to my surprise (Jones, 2000), and as I searched about 100 galls, I also uncovered a number of small brown hoverfly larvae. Thinking it might be an interesting rearing record, I collected a dozen or so, together with the half unravelled but still aphid-occupied galls, into a selection of medium-sized glass tubes. The larvae remained in the tubes, half forgotten throughout the winter, and when patches of mildew and mould developed on the shrivelling galls I sadly anticipated that I had lost the subjects of my study to an age-old problem.

However, on 10.v.2000 I examined the tubes to discover a small black hoverfly had emerged. It was a dead female and rather shrivelled, but over the next few days several more specimens, males and females, appeared. They seemed to be what some European entomologists have called *Heringia senilis* Sack.

IDENTIFICATION

As per all other British lists, Stubbs & Falk (1983) include only *Heringia* (*sensu stricto*) *heringi* (Zett.) as British, but they allude to another species included by van der Goot (1981) in his Dutch hoverfly book, quoting hind tibial hair colour as a tantalizing distinction. His work is a Dutch translation of a key to the species of European Russia by Stackelberg (1970), modified to include additional species known to occur in the Low Countries, Britain, Ireland, Denmark and Northern Germany. He uses the hair colour of the male hind tibia as a primary distinctive characteristic, but also figures the male genitalia, suggesting the possibility of some further distinguishing features.

Verlinden (1991) also includes *H. senilis* in his Belgian hoverfly fauna, and again uses hind tibial hair colour in the male as a major distinguishing character. He also quotes various other characters, and makes further use of male genital shape to characterize the species.

When examining the flies that had emerged from my *Pemphigus* galls, the papers by van der Goot (1981) and Verlinden (1991) were not able to wholly convince me that my specimens were truly *H. senilis*. This was mainly because I could not easily

appreciate some of the suggested genitalia characters, and there appeared to be contradictions between some of these distinctions and the non-genitalia identifiers.

The important paper by Claussen *et al.* (1994) finally gave some clarity to my muddle. As well as using antennal shape and hind tibial hair colour, the shape of the post-anal lamella, a small shield-shaped plate visible between the surstyli, proved to be a convincing character and the interpretation they put forward for the two taxa agreed with my specimens, together with specimens of *H. heringi* in the Natural History Museum collection.

In their revision of the genus, Claussen *et al.* (1994) confirm that *H. heringi* is a valid species, but they are cautious of the true status of *H. senilis*. Despite maintaining it as a separate species, and nominating a lectotype for it, they note that no constant characters could be found to differentiate *H. senilis* from *H. heringi*. Their frustration revolved around variation between different European populations; so far, the British specimens that I have examined do conform fairly well to two separate species. Therefore, with an echo of their caution, I offer *Heringia senilis* here as a new British species.

Key to the British species of *Heringia* (*sensu stricto*)

The genus *Heringia* now includes those species formerly in the genus *Neocnemodon*, which is reduced to subgeneric status by Gilbert & Rotheray (1989). The subgenus *Heringia sensu stricto* is distinguished, as in the keys of Stubbs & Falk (1983), by the males having no spine on the hind trochanter. *Heringia senilis* is almost identical to *H. heringi*, to which it will work in the key by Stubbs & Falk (1983). Distinction between the two species is as follows:

1. Male (eyes meet on top of head) 2

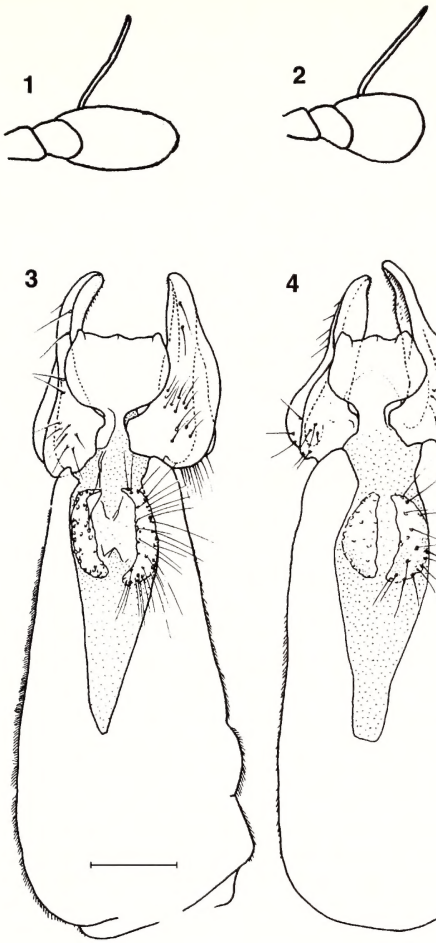
– Female (eyes separated). Confident identification not possible ..... *H. senilis* Sack and *H. heringi* (Zett.)

2. Third antennal segment longer (Fig. 1), about twice as long as wide. Outer edge of hind tibia clothed with long white hairs. Dorsum of pronotum covered with white hairs. Post-anal lamella, the small shield-shaped plate visible between the surstyli, relatively straight across its apical edge, with only very small teeth at corners (Fig. 3) ..... *H. senilis* Sack
– Third antennal segment shorter (Fig. 2), about 1.5 times as long as wide. Outer edge of hind tibia clothed with long black hairs. Dorsum of pronotum covered with dark hairs. Post-anal lamella indented along its apical edge, with definite teeth at corners and sometimes also at centre (Figs 4–6)..... *H. heringi* (Zett.)

Discussion on specific status and variation in characters

Most previous authors have concluded, reluctantly, that the status of *H. senilis* remains uncertain. Despite trying to find clear characters to distinguish it from *H. heringi*, there always seems to be intermediate variation between the two species such that no constantly reliable characters have been found.

The key by van der Goot (1981) is a Dutch translation, with additions, from a previous work by Stackelberg (1970) on Russian flies. In it, van der Goot relies most on male hind leg hair colour, but also illustrates the male genitalia. He suggests that the surstyli of *H. senilis* are shorter and thicker with different sculpture, but I found the diagrams difficult to interpret when examining my specimens. He also lists pale



Figures 1 & 2. Male antenna of *H. senilis* (1) and *H. heringi* (2). (Note: females have third antennal segment longer than males, the antenna of female *H. heringi* resembling that of male *H. senilis*.)
Figures 3 & 4. Dorsal view of male genitalia of *H. senilis* (3) and *H. heringi* (4), southern Germany. Note, in particular, the relative shapes of the shield-shaped plate between the surstyli, the post-anal lamella, which is evenly truncate with only minute side denticles in *H. senilis*, but distinctly indented with obvious side teeth in *H. heringi*. Scale bar = 0.2 mm. Reproduced, with permission, from Claussen *et al.* (1994).

hairs on the male face, femora, thoracic pleura and dorsum, and abdominal segments as indicating *H. senilis*, together with the longer oval shape of the female mouth opening, and white hairs at the base of the female costa. Incidentally, van der Goot (1981) also states in his key that females of *H. senilis* lack dust spots on the frons, reiterating part of Stackelberg's (1970) key. However, in a separate note, he comments that Sack's original description makes no mention of missing frontal dust

spots, and he also reports the finding of a female corresponding to this species, yet having the dust spots as usual. All the females that emerged in conjunction with my males of *H. senilis*, show clear dust spots on the frons.

Verlinden (1991) again uses hind tibial hair colour as his primary distinguishing character. He also repeats the comparison between the surstyli: their relative lengths and sculpture, but again, I found the figures very difficult to interpret when examining the specimens. Verlinden is the first to describe the plate between the surstyli. He reports it as being practically straight but roughly dentate along its top edge in *H. heringi*, and with three large teeth in *H. senilis*. However, this interpretation is directly contradicted by the later work of Claussen *et al.* (1994). It is also contradicted by the much earlier work of Verrall (1901), whose diagram of the genitalia of *Heringia* (then *Pipizella*) *heringi* clearly shows this plate to be strongly three-toothed (Fig. 7). Verlinden also repeats the list of characters, including pale hairs on the male face and abdominal segment 8 as indicating *H. senilis*, together with the shape of the female mouth opening, and white hairs at the base of the costa.

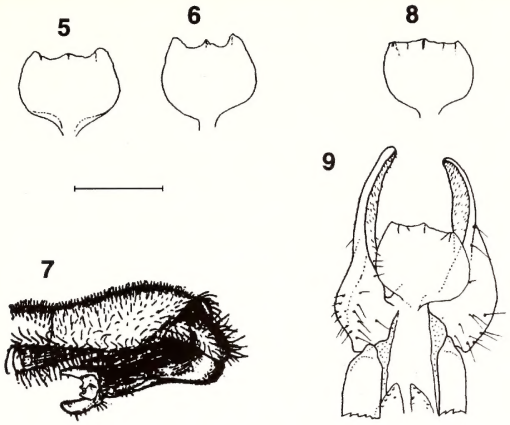
As stated above, however, it is the review by Claussen *et al.* (1994) which resolves some of the difficulties; their interpretation of the *H. senilis*/*H. heringi* species pair agrees most closely with the UK specimens of both species that I have seen. There remain some difficulties however.

The relative widths and lengths of the surstyli are again quoted by Claussen *et al.*: those in *H. senilis* reported as being 3.1 times as long as wide, those in *H. heringi* being 3.2–3.6 times as long as wide. The marginal sculpture of the right surstylus is reported as being stronger in *H. senilis*. Despite their inclusion of several diagrams of the surstyli, I found it difficult to interpret these characters, not least because the size and shape of *H. heringi* surstyli vary and 5 different surstyli figures are given for this species. Another equally variable character reported is a steely blue shimmer on the face and frons of *H. senilis* compared to black in *H. heringi*, but doubt is thrown on this because the colouring seemed to disappear with age.

It was the clear description and figures of the post-anal lamella that convinced me that I agreed with the analysis by Claussen *et al.* (1994), despite seeing limited UK material of *H. heringi*. In *H. senilis* this plate is always shield-shaped, with only the smallest of tooth-like prominences on the top corners (as in Fig. 3). In *H. heringi*, however, the corners were distinctly pronounced (as in Figs 4–6) and in one example clearly tridentate (as in Fig. 7). Despite this apparent conformity of characters, Claussen *et al.* report that, in *H. heringi*, the post-anal lamella appears to vary between populations from different parts of Europe. In two reputed specimens of *H. heringi* from Crete this plate exactly resembled *H. senilis* (Figs 8 & 9), and one of the examples was also clearly white-haired. They, however, conclude that the two specimens are *H. heringi* because of the thickly black-haired hind tibiae.

A summary of the characters used in distinguishing *H. senilis* and *H. heringi* is given in the table.

The material available to me has been limited. Of the 11 specimens reared from Forster Memorial Park, only 5 were males; however they all agreed with the interpretation of *H. senilis* put forward by Claussen *et al.* (1994)—with the exception of one which had a few black hairs amidst the white on the hind tibiae. Comparison with Turkish and Greek (Corfu) specimens of *H. senilis* in the European collection of the Natural History Museum confirmed their general similarity. However, there were only a handful of specimens in that collection and they had been identified using hair colour and antennal length; none of the males had the genitalia pulled out for examination.



Figures 5 & 6. *Heringia heringi*, post-anal lamella, specimens from northern Germany (5) and Romania (6). Reproduced, with permission, from Claussen *et al.* (1994)
Figure 7. Male genitalia of *H. heringi*. Note the distinctly three-toothed plate between the surstyli, the post-anal lamella, at the extreme apex of the genitalia. Reproduced from Verrall (1901).
Figures 8 & 9. Post-anal lamella of *H. heringi*, specimens from Crete, closely resembling *H. senilis* in that they show hardly any sign of being toothed at the corners. Reproduced, with permission, from Claussen *et al.* (1994).

Of the very many specimens of *H. heringi* in the British collection of the Natural History Museum, several appeared to be pale-haired, but they may have been teneral or faded. Certainly the antennae of these specimens were generally shorter than in my *H. senilis*. Only three specimens had the male genitalia extracted for examination, but luckily, they all showed the large corner teeth on the post-anal lamellae.

Since then some more material has come to light. Of three specimens reared from *Pemphigus* galls in Cambridge, and sent to me by Nathan Pike, one was a male, which conformed to *H. senilis*. And some damaged part-specimens, also from Cambridge, contained four loose male abdomens, all of which showed *H. senilis*-shaped post-anal lamellae.

Finally, two further males of *Heringia* emerged in January 2001 from *Pemphigus* galls collected from another south-London site, Peckham Rye Park, during October 2000. One was distinctly *H. senilis*, the other worked to *H. heringi*, except that the third antennal segment was longer than usual.

Specimens, a male and an associated female, have been deposited in the collections of the Natural History Museum (London), National Museums & Galleries of Wales (Cardiff) and British Entomological and Natural History Society (Dinton Pastures). Additional material will also be placed in the collections of the National Museums of Scotland (Edinburgh), from amongst specimens reared from larvae already donated.

Biology, life history and distribution

The larvae of *Heringia* were found inside the characteristic spiral leaf petiole galls caused by the common communal aphid *Pemphigus spyrothecae* (Figs 10 & 11).

Table. Summary of characters distinguishing *Heringia senilis* and *H. heringi* (males only), derived from Claussen *et al.* (1994).

	H. senilis	*H. heringi*
Antennal segment 3	Elongate, about twice as long as wide (Fig. 1).	Oval, at most about 1.5 times as long as wide (Fig. 2). (NB: in female it is twice as long as wide.)
Hind tibiae	White-haired on anterior and dorsal surfaces.	Black-haired on anterior and dorsal surfaces.
Top of thorax	White-haired on disc.	Dark-haired on disc.
Post-anal lamella	Evenly serrate with many small teeth (Fig. 3).	Distinctly toothed at corners, sometimes also at centre (Figs 4–7).
Surstyli	Shorter and broader, 3.1 times as long as wide, less sculpture.	Longer and narrower 3.2–3.6 times as long as wide, more sculpture.
Face	White haired.	Dark haired.
Frons	Shimmering dark blue.	Black.
Eyes	White-haired.	Black-haired.

Unlike many aphids it utilizes but a single host plant. The sexuparae (a parthenogenetic pre-sexual generation) leave the galls from early September onwards and aggregate in the cracks in the bark. Each sexupara gives birth to about two males and five females. Mating occurs immediately that the sexuals are mature (they go through four moults but do not feed) and each female lays a single egg. These eggs over-winter in the crevices of the tree after the leaves and their associated galls have fallen. The foundresses emerge to start new galls in the spring.

To the naked eye the larvae of *H. senilis* exactly resembled those of *H. heringi* described by Rotheray (1993), being small (about 5 mm) brown, flattened and covered with many tiny round papillae. A full description of larva and puparium is now underway (Rotheray, in preparation).

When the spiral galls are slightly untwisted, the fluffy aphids are revealed inside (Fig. 12), together with a blob of honeydew dusted with a waxy coating which prevents it clogging the gall's occupants. The galls first appear in spring (Fig. 10), but are at their most developed in August and September (Fig. 11), and it was at this time that the *Heringia* larvae and other occupants were found. Early in October the leaves start to fall and the galls turn red and yellow, making them especially obvious on heavily galled trees. Fallen galls sometimes contained aphids, but no *Heringia* larva or other insects were found in them.

Under artificial conditions the *Heringia* larvae left the galls and remained dormant, resting on the sides of the glass tubes through the winter. In an unheated room in the winter of 1999/2000 they finally pupated in April and adult flies emerged in May. However, in a heated room in the winter of 2000/2001 they pupated in early January and emerged at the end of the month.

Pemphigus is also unusual in that it has a primitive caste system, with some of the first-instar nymphs taking on the role of soldier. These soldiers are able to attack and repel various aphid-predator invaders, but may ignore, or are incapable of detecting, *Heringia* larvae (Pike, in preparation). The presence of large numbers of *Heringia*

Figures 10 & 11. Spiral galls caused by the communal aphid *Pemphigus spyrothecae* in the leaf petioles of Lombardy poplar, Forster Memorial Park, 6.v.1999 (10) and 10.viii.1999 (11).

Figure 12. Partly opened gall of *Pemphigus spyrothecae*, revealing the aphids within, Forster Memorial Park, 10.viii.1999.

larvae inside the galls surely testifies to the flies having evolved some strategy for avoiding this attack.

On the Continent, *Heringia senilis* is reported to be widespread in central and southern Europe, the Caucasus, Transcaucasia, Kazakhstan and Uzbekistan. Likewise, *H. heringi* is noted across the whole of Europe, from Scandinavia to Spain, east into Turkey, Siberia and Mongolia (Claussen *et al.*, 1994). No clear distinction is made between any habitat preferences. Given that both species were reared from south-London *Pemphigus* galls, it seems likely that both species have similar life histories, and that *H. senilis* may well be an overlooked but widespread species in Britain.

With experience of only limited British localities it is difficult to draw any conclusions about *Heringia* habitat preferences in Britain, except to note that both Catford and Peckham sites were formerly old parkland, with many very old trees (though not necessarily the Lombardy poplars) which pre-date the present metropolitan layouts. Peckham Rye was formerly part parkland and part farmland; it is now predominantly utility grass and playing fields with relatively little invertebrate interest. Forster Memorial Park, on the other hand, is reckoned to be a double assart (a medieval clearing within a wood for agricultural purposes), with remnants of possibly ancient woodland remaining as wooded edging strips. Other old woodland insects found there included the nationally scarce hoverfly (Syrphidae) *Didea fasciata* Macquart, the nationally scarce stilt-legged fly (Megamerinidae) *Megamerina dolium* (Fab.), the nationally scarce fungus beetle (Melandryidae) *Abdera quadrifasciata* (Curt.), the stag beetle (Lucanidae) *Lucanus cervus* (L.); the

nationally scarce weevil (Curculionidae) *Cossonus linearis* (Fab.), and the nationally scarce timber-nesting ant (Formicidae) *Lasius brunneus* (Latr.).

Apart from *Heringia senilis*, other inhabitants of the *Pemphigus* galls included: *Heringia heringi*, male, emerged 27–29.i.2001, Peckham Rye: *Meliscaeva auricollis* (Meigen), male, emerged xi.2000, Peckham Rye; *Wesmaelius subnebulosus* Stephens (Neuroptera: Hemerobiidae), female, emerged xi.2000, Peckham Rye; *Anthocoris minki* Dohrn (Hemiptera: Anthocoridae), many specimens in the galls, 30.ix.1999, Forster Memorial Park; a diplazontine hoverfly parasitoid (Hymenoptera: Ichneumonidae), emerged 1–5.iii.2001, Peckham Rye.

Conclusion

The exact status of *Heringia senilis* remains in doubt, but it is clear that it and *Heringia heringi* found an intriguing niche when they invaded the self-contained and secret world of the *Pemphigus* gall. The aphid and its galls are common and widespread, and obviously worthy of closer attention from dipterists and other naturalists.

Acknowledgements

The initial survey of Forster Memorial Park was originally commissioned by John Archer, of the London Ecology Unit (now the Greater London Authority), on behalf of the London Borough of Lewisham. Malcolm Smart of Wolverhampton kindly translated relevant parts of the keys by van der Goot (1981) and Verlinden (1991), and Felicia Ure translated parts of the paper by Claussen *et al.* (1994). Nigel Wyatt of London's Natural History Museum made available the museum's *Heringia* specimens and concurred with my interpretation of the sometimes difficult genitalia characters. Nathan Pike of the University Museum of Zoology, Cambridge, supplied some of his leftover specimens of *Heringia* and provided information on the biology of *Pemphigus* aphids. Graham Rotheray of the National Museums of Scotland in Edinburgh enthusiastically took on the task of studying some of the *Heringia* larvae. Claus Claussen of Flensburg, Germany, granted permission to reproduce some of the line figures from his paper. Colin Plant identified the lacewing that emerged from one of the galls. Additional information, advice and support were also given by Alan Stubbs and Peter Chandler. My thanks go to all these people for their help in preparing this paper.

Incidentally, the discovery of *Heringia senilis* was a direct result of a feature on *Pemphigus* galls in the August 2000 issue, of *BBC Wildlife*. Asked to provide some editorial background information about the aphids, I agreed to photograph them in their galls. In the event the photos were not used, but during the search in Catford I first uncovered the *Heringia* larvae.

References

Claussen, C., Goeldlin de Tiefenau, P. & Lucas, J. A. W. 1994. Zur Identität von *Pipizella heringi* (Zetterstedt) var. *hispanica* Strobl, 1909—mit einer Typenrevision der Paläarktischen Arten der Gattung *Heringia* Rondani, 1856, *sensu stricto* (Diptera: Syrphidae). *Mitteilungen der Schweizerischen entomologischen Gesellschaft = Bulletin de la Société Entomologie Suisse* **67**: 309–326.

Jones, R. A. 2000. The recent occurrence of *Anthocoris minki* Dohrn (Hem.: Cimicidae) in London. *Entomologist's Record and Journal of Variation* **112**: 185–186.

Pike, N. 2001. The influence of predators on the evolution of aphid soldiers. PhD thesis, University of Cambridge, in preparation.
Rotheray, G. 1993. Colour guide to hoverfly larvae (Diptera, Syrphidae) in Britain and Europe. *Dipterists Digest* **9**: 1–156
Rotheray, G. E. & Gilbert, F. S. 1989. The phylogeny and systematics of European predaceous Syrphidae (Diptera) based on larval and puparial stages. *Zoological Journal of the Linnean Society* **95**: 29–70.
Stackelberg, A. A. 1970. Syrphidae. In: Bei-Bienko, G. Y. (ed.) Classification key to the insects of the European part of the USSR. *Opredeliteli po Faune SSSR* **103**: 11–96.
Stubbs, A. E. & Falk, S. J. 1983. *British hoverflies: an illustrated identification guide*. Reading: British Entomological and Natural History Society.
van der Goot, V. S. 1981. *De zweefvliegen van Noordwest-Europa en Europees Rusland, in het bijzonder van de Benelux*. Amsterdam.
Verlinden, L. 1991. *Fauna van Belgie: Zweefvliegen* (*Syrphidae*). Brussels: Koninklijk Belgisch Instituut voor Natuurwetenschappen.
Verrall, G. H. 1901. *Platypezidae, Pipunculidae and Syrphidae of Great Britain*. British flies vol. 8. London: Taylor and Francis.

An appeal for material of British Psychidae

As part of my studies into the effects of atmospheric pollution on lichenophagous bagworm moths (Lepidoptera: Psychidae) I am conducting an analysis of the genetics (DNA) of the British bagworms. In order to complete this I wish to include the following species:

Dahlica lichenella (L.)
Bacotia sepium (Speyer)
Proutia betulina (Zeller)
Psyche crassiorella Bruand
Whittleia retiella (Newman)
Acanthopsyche atra (L.)
Pachythelia villosella (Ochsen.)
Sterropterix fusca (Haw.)

I would be very grateful if readers could supply me with fresh material reared or collected during the last 3 or 4 years. A small fragment such as a leg or a piece of pupal exuvia is all that is required, provided that identification of the species concerned is sound. Alternatively, advice concerning known habitats and timings when larvae may be obtained would be most welcome. I can supply readers with postage tubes for dried material and will refund postage and packing. Thanking you in anticipation.—IAN SIMS, 2 The Delph, Lower Earley, Reading, Berkshire RG6 3AN. Email: sims@wrcplc.co.uk

THE DEVELOPMENT OF A PRACTICAL TECHNIQUE FOR ACHIEVING REALISTIC PHOTOGRAPHIC IMAGES OF SET INSECT SPECIMENS

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Abstract. The development of equipment and techniques for the photography of set insect specimens is described. Information is given to enable the equipment to be made easily, using readily available materials. A method has been developed which gives repeatable and consistent illumination of the specimen including controlled directionality of lighting. True representation of metallic and iridescent colours, pollination patterns, surface sculpture and texture is assured.

The equipment is inexpensive, compact, robust without being excessively heavy, and it breaks down into conveniently transportable modules. It is designed to be adaptable and easily tailored to suit current 35 mm camera systems. This design avoids the risk of flare in the resulting photographs and optimises specimen management including positioning, orientation and focusing.

Set specimens covering ranges of body lengths from 100 mm to 2 mm are routinely photographed and the equipment is capable of photographing small structural details as small as 0.3 mm long. This range of specimen size is accommodated using photographic Macro lenses, between 20 mm and 50 mm in focal length, in conjunction with extension tubes. A mixed batch of 36 insects of varying sizes can be typically photographed comfortably in less than two hours.

The use of consistently high quality standardised photographs via Photo CD or Internet access is discussed as an aid to specialists working on groups of insects in which specimens are widely scattered amongst a number of institutions; this technique would enhance the availability of visible characters for taxonomic and identification purposes.

INTRODUCTION

In 1995 I resumed an active interest in entomology and joined the Lancashire and Cheshire Entomological Society, and soon afterwards became a volunteer working in the Entomology Section of Liverpool Museum, National Museums and Galleries on Merseyside, on a biodiversity study of the invertebrate fauna of the Greek island of Chios.

It was recognised that the development of a high quality technique for photographing insect specimens would significantly enhance the availability of museum information for taxonomic and identification purposes. Detailed images of interesting specimens could be easily sent to any number of overseas specialists without risking damage to delicate specimens. Transfer of high quality images onto Photo CD format, and availability over the Internet, would also be natural and desirable developments. In order to produce a Photo CD of high quality photographs of set specimens, it would be necessary to develop a photographic technique which had the following features:

The method of illuminating the specimens would have to be standardised and consistent, including controlled directionality. Ring flash would have to be discounted, due to its limitations when photographing metallic or iridescent colours

and surface sculpturing. The colour temperature limits of the lighting would have to be agreed. The need for consistent colour standards would require the nomination of a specific colour reversal film. Film format would be 35 mm. A standard background colour, or a small number of standard options, would need to be agreed. In addition to these essential features, it was considered desirable to make the equipment transportable, robust but not too heavy, inexpensive to construct and easily made. Equipment would need to be readily adaptable to current 35 mm cameras and systems.

Progress to date

Initial photographic experiments in 1996 soon showed that there were severe limitations regarding the use of fibre-optic illumination and photomicrography, mainly with respect to contrast control and convenience of use when presented with specimens covering large size differences. Consequently development priority was given to the achievement of even illumination with controlled directional bias and correct contrast. Using natural north light as the experimental light source, an articulated mirror system was developed which achieved all these requirements.

The results from the equipment shown in Figure 1 were encouraging, yielding good overall contrast and directionally controlled illumination by way of a cheap, easily produced and adaptable basic mirror design. However there were limitations due to the need for good daylight and weather. In addition, small apertures and long extension tubes resulted in very long exposures (up to two minutes), often resulting in reciprocity failure in the film emulsion. The equipment was very large and heavy and was not really portable.

To cater for very small specimens of insects with body lengths down to 2 mm or small structural details down to 0.3 mm, which resulted in short objective-lens-to-object distances, it was recognised that the use of bellows-mounted photographic lenses would be precluded due to interference with the articulated mirror system. All development was therefore based upon the use of extension tubes.

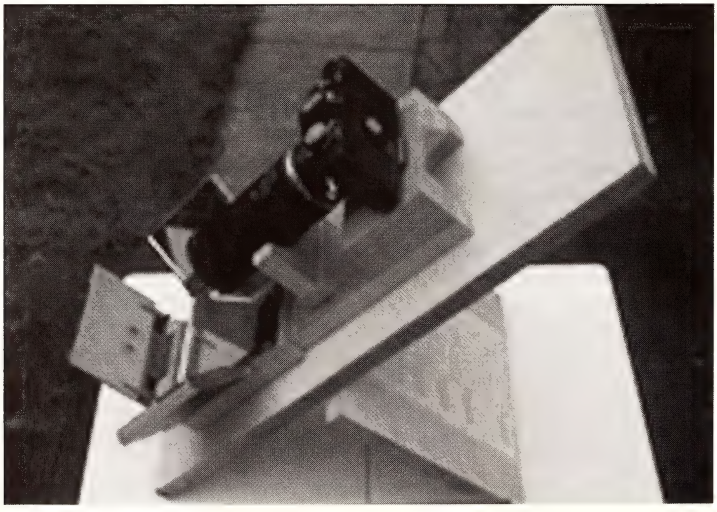


Figure 1. Articulated Mirror Development.

The next development phase was therefore devoted to adapting the system to the use of artificial light. Early experiments into the use of fixed Photoflood light sources soon showed up a number of shortcomings, mainly excessive heating-up of equipment and specimens, and also impractical aspects associated with specimen management and staging and image adjustment and focusing. All subsequent development was based on the use of electronic flash light sources, initially directly onto the articulated mirror system, with unsatisfactory results. Equipment and techniques were then developed which replaced the natural 'North Light Open Sky' source with an artificial one based upon a highly reflective light-scattering top panel which was illuminated using electronic flash.

Several problems had to be overcome before full development could be completed; these included optimising the positioning of the electronic flash units in relation to top and side reflecting panels, the articulated mirror system, the specimen stage, extension tubes and the camera objective lens. In completing this work, the equipment and techniques associated with its use had to avoid the need to use powerful flash guns, in order to reduce cost, size, weight and to ensure portability. Interference with specimen management regarding positioning, orientation, changing specimens, focusing and flare in the resulting photographs had also to be avoided.

Development of equipment and the techniques for using it were completed in the late summer of 1998.The camera equipment used in the prototype system comprised Olympus OM2n, OM2SP, and OM4 cameras; extension tubes; Olympus 50 mm Macro, 38 mm Macro and 20 mm Macro lenses. Experiments were also made using a reversed 24 mm Olympus wide-angle lens. The flash guns used were one Olympus T32 and one T20. An additional Sunpak 3500 flash gun was used for photographing at very high magnifications with the 20 mm Macro lens. Exposures were automatic using the camera systems together with standard Olympus connectors. Current work is standardised on Fujichrome Velvia slide film ISO 50/18°, and Agfacolor Ultra 50 Professional for prints. The new Fuji Provia 100F slide film is currently being assessed, including rating this film at up to 400 ASA. All specimens are staged against a standard background comprised of photographic 'grey card'.

Description of the developed equipment

Figure 2, with top panel and flash guns removed for clarity, shows the relationship between the five modules which, when assembled together, create the operating system.

The function of the baseboard is to hold together the Light Diffuser in its correct relationship to the camera platform, the flash gun/stage carriage and the Articulated Mirror Assembly. The base board is made from white-painted 3 mm thick hardboard; in the prototype this was 610 mm wide and 510 mm deep. The lateral constraint for the other modules is provided by two pieces of wood, 19 mm by 11 mm and 380 mm long, screwed and glued to the hardboard.

Figure 3 shows the underside view of the camera platform. The prototype platform is made from a piece of seasoned oak 20 mm thick by 388 mm long and 148 mm wide. Two additional pieces of oak, together totalling 43 mm in thickness, 148 mm wide and 94 mm long, are pinned and glued to one end to form the raised camera mounting position. As shown in the inverted view, the rear of the platform is hollowed out underneath to allow for easy access to the locking collar when changing cameras. The actual camera seating and locking collar used on the prototype was salvaged from a broken pan-and-tilt head. The height of the additional pieces of wood at the camera end of the platform suits the use of Olympus cameras; some

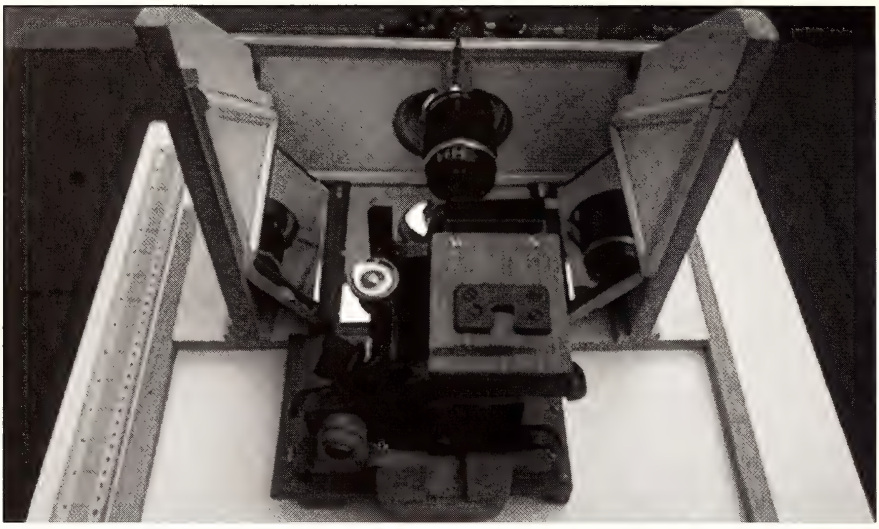


Figure 2. The developed equipment.

alteration may be required to this dimension if other makes of camera are used. The overall length of the platform can be increased or reduced depending upon the size of camera being used and the maximum length of extension tubes plus lens envisaged. In the case of Olympus cameras, with a reversed 24 mm lens and an extension tube length of 205 mm, the overall length of the camera platform would need to be 600 mm.

Figure 3. Camera platform underside.

The design can be modified to cater for the use of platform extension pieces so as to make the equipment more compact for transport purposes. An additional saddle support is used with long extension tube lengths to ensure rigidity in operation.

Figure 4 shows the two articulated mirror assemblies required to operate the system over the range of lenses and extension tube lengths described. The longer one is used for cases requiring longer focal length lenses and longer extension tubes. The method of construction is the same in both cases, the only differences being in overall length.

The construction of the mirror assemblies is based on a simple wooden saddle. In the prototypes these were made from 12 mm thick high-quality plywood, 177 mm wide by 178 mm long (107 mm for the shorter mirror). Lateral constraint was provided by longitudinal wooden side pieces made from oak and separated by a distance slightly greater than the width of the main length of the Camera Platform, so as to allow for ease of sliding them along; the thickness of the side pieces was slightly less than the thickness of the camera platform for the same reason. The base mirror covers most of the upper surface of the saddle. The wing mirrors, fastened by brass hinges to the sides of the mirror saddle, are shorter in length than the base mirror by a length of 45 mm and positioned at the end furthest from the camera. This is to cater for the overlapping of the rear light diffuser panels over the rear edge of the base mirror when assembled. The width of the wing mirrors is the maximum which will allow the mirrors to be stowed away with the side mirrors folded mirror-to-mirror with the base mirror. In the prototype mirrors, this resulted in side mirror assemblies 85 mm wide, including space for the brass hinge. Mirror glass used is 4 mm thick and fastened to wood using flexible mirror glass adhesive. The prototype larger mirror was provided with a clamping screw fitted to one of the side members, but this feature did not prove to be necessary in practice.

Figure 5 shows five reflecting panels which make the light diffuser: Two side support panels are used to support the top reflecting panel at an angle of 45° to the

Figure 4. Articulated Mirror Assemblies.

horizontal and to fix the wing mirrors at angles of 45° to the horizontal when deployed to the maximum extent. The other two reflecting panels are the two rear ones which surround the extension tube/lens combination during operation.

The top reflecting panel measures 298 mm across by 199 mm wide overall, the edge members being 20 mm thick. The reflecting surface, in common with all diffuser reflecting surfaces, is made by fixing a piece of 4 mm mirror glass to the base using mirror glass adhesive. Positioned on top of this is a piece of 2 mm thick translucent, opaque, white, textured plastic as the actual light scattering and diffusing medium (Polystyrene 'Cracked Ice Opal' from Glaziette Ltd., Manchester, telephone 0120 479 1185), and it is secured in position by the wooden edge members. This piece of plastic is placed with the textured surface facing the light source and the smooth surface against the mirror.

The prototype side support panels were made from 17 mm white-faced chipboard, with base dimensions 130 mm wide by 138 mm long; the vertical side pieces are 148 mm long and 170 mm high at the rear, but 290 mm high at the front. When assembled onto the base, the overall height of the upper surface of the top panel bearers on the side pieces is 287 mm high at the front and 143 mm high at the back. The height of the base of the bottom triangular diffuser panel support above the top of the side panel base is 89 mm. A metal stop is screwed to the rear top edge of each side member to stop the top reflecting panel from sliding down the panel bearers during operation. Cut-outs are made in the base members to clear the articulated mirror clamping knob, if fitted, and the corners of the flash gun/stage carriage if necessary. The triangular side diffuser panels are made in the same way as described for the top panel.

The two rear reflecting panels are also made from 17 mm white-faced chipboard and are designed to reflect light back onto the subject directly and by re-reflection. When pushed together, these two panels create a reflecting surface 340 mm wide overall, including edge members 150 mm high, except for the central circular clearance for the lens/extension tube assembly. When in position, the inboard lower

Figure 5. Components of the Light Diffuser.

surfaces of the rear reflecting panels rest on the surface of the base mirror of the articulated mirror assembly at the edge nearest to the camera, a height of 38 mm above the base board on the prototype system. Provision was made for this by shortening the lengths of the wing mirrors by 45 mm as noted before. The bases of the rear reflecting panels, 72 mm long by 123 mm wide, are cut out at their inboard forward corners to clear the corners of the articulated mirror assembly saddle. When assembled, the height of the tops of the rear reflecting panels is 189 mm above the base board.

For basic photography of specimens, where there is no requirement to use special highlighting of features by means of additional fibre-optic illumination, lightweight versions of the top and rear reflecting panels have been developed. Construction is based on artists' mounting board upon which is placed a piece of thin mirrored plastic film. The insides of potato crisp packets and silver-mirror-finished party balloon material were used with equal success. A piece of 'Cracked Ice Opal' is finally placed on top and the whole assembly secured by placing pieces of plastic document binders of triangular section along the edges.

Figure 6 shows the flash gun/stage carriage, with the flash guns removed for clarity; its function is to provide a stable base for the specimen stage and a method of moving the specimen longitudinally in order to achieve precise focusing without backlash. It must also provide a means of lateral and vertical adjustment of the position of the specimen to give the required orientation to the camera. The carriage must provide correct positioning of the flash guns so as to maximise the use of light and eliminate the risk of flare.

The design and construction of this module is based upon a saddle platform which can be moved along the camera platform to suit the positioning requirements dictated by the selected combination of extension tube length and lens. In developing the prototype system this module was based upon the use of a dissecting stand and associated mechanism. A heavy black-lacquered brass dissecting stand by Prior of

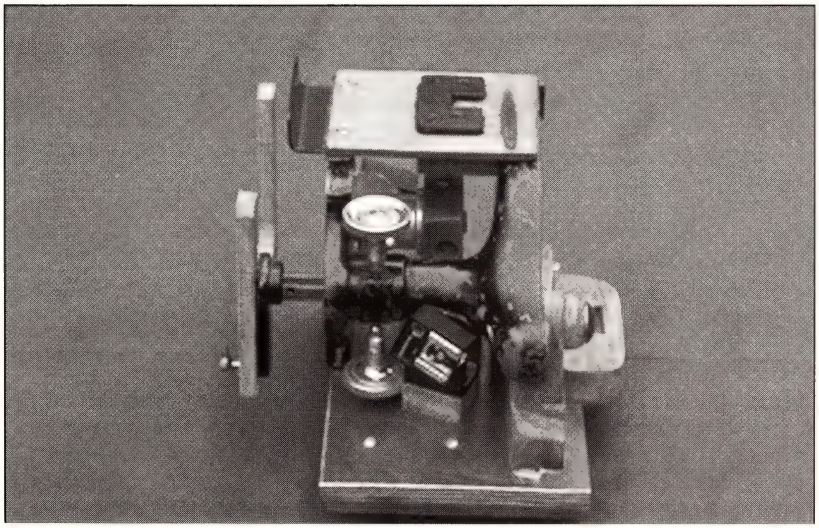


Figure 6. Flash Gun/Stage Carriage.

London, which included a triangular cross-section rack-and-pinion stage-positioning mechanism, was purchased for £5 in a used equipment sale at a meeting of the Manchester Microscopical Society.

This stand was carefully fastened on its side to the saddle platform to give a smooth horizontal traverse of the rack along the axis of the camera platform. All superfluous items were removed including an articulated magnifying glass and a concave adjustable reflecting mirror. The stand was positioned so that one of the knurled brass pinion adjustment wheels was uppermost for ease of operation when fine focusing the specimen using the camera viewfinder.

The specimen holder was made from Tufnol, a fabric-reinforced resin material, 8 mm thick and 133 mm wide by 105 mm high, fitted with two microscope stage clips and attached to the end of the dissecting stand rack. The vertical positioning of the specimen holder was such that it rested gently on the base mirror surface of the articulated mirror assembly during operation. The dissecting stand rack-and-pinion provides fine horizontal adjustment over a distance of 62 mm, vertical and lateral adjustment of the specimen was achieved manually by sliding the insect staging grey card between the microscope stage clips and the Tufnol support.

The saddle platform for the prototype system was made from 12 mm thick high-quality plywood, 210 mm wide by 125 mm long, with lateral restraint provided by longitudinal oak side pieces screwed and glued to the underside of the platform, the separation between these side members being slightly larger than the width of the camera platform. The platform was extended slightly to one side to cater for the positioning of a side-mounted flash gun (Olympus T20). The upper side arm and side of the base of the dissecting stand provided convenient attachment points for a piece of 5 mm plywood, 84 mm wide by 104 mm long, upon which the accessory shoe for the Olympus T32 flash gun was mounted.

Provision was also made in the prototype system for the side mounting of a second Olympus T20 flash gun via a shoe placed on an adjustable mount on the saddle base between the lower arm and base side of the dissecting stand.

Experimentation demonstrated how critical the positioning of the flash guns was in relation to the top reflecting panel. The upper flash gun, the T32, had to be as close as possible to this panel and had to be horizontal; likewise the side-positioned T20 flash guns had to be as close to the top corners of the insect staging board as possible. The insect staging boards have now been standardised on photographic grey card, 150 mm wide by 105 mm high.

Figure 7 shows how the specimen staging boards are positioned in relation to the flash guns so that the lens is screened from direct light from them, thus avoiding flare.

For photographing very small specimens at high magnifications, e.g. when using the 20 mm Macro lens with a very small working distance (17 mm), it was necessary to develop a special flash gun and stage carriage incorporating a microscope mechanical stage for precise specimen position adjustment.

Figure 8 shows the carriage fitted with a CT-11 mechanical stage purchased from Lakeland Microscopes for £34. Provision has also been included for the necessary additional Sunpak 3500 flash gun.

Figure 9 shows how to construct a reversal arrangement when special Macro lenses down to 20 mm in focal length are not available. A reversal arrangement was constructed for the prototype system using a Tamron Adaptall 2 Olympus mount attached using a plywood annulus and epoxy resin to a threaded coupling ring to suit the filter thread at the front of an Olympus 24 mm lens. In order to be able to stop this lens down to f/16 an adaptation was made to an Olympus lens base cap whereby a curved plywood piece was fixed inside, using epoxy resin, to operate the lens stop

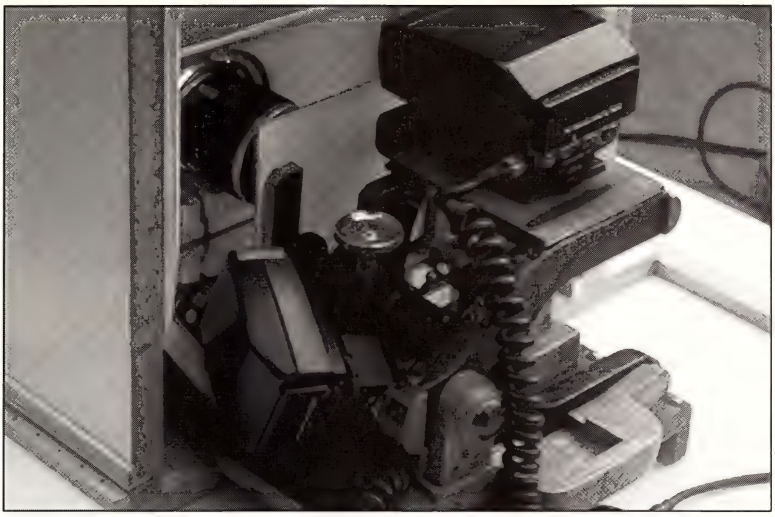


Figure 7. Relative positions of specimen staging boards and flash guns.

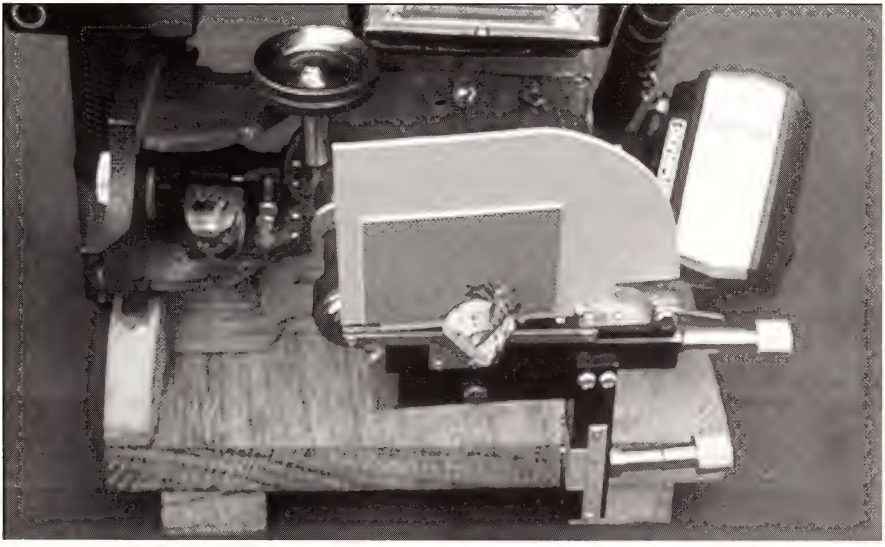
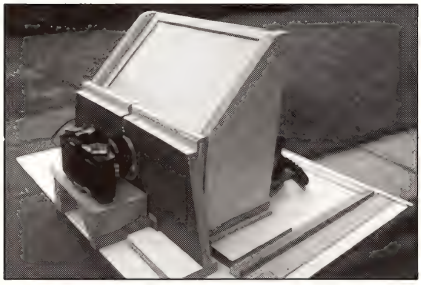


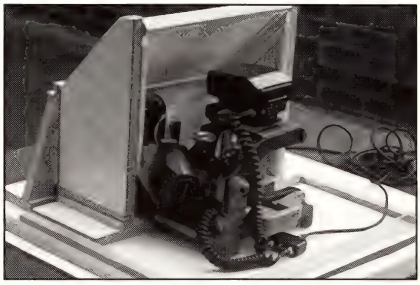
Figure 8. Stage Carriage fitted with mechanical stage.

down lever by rotating the cap. The centre of the cap was cut away to give a 30 mm diameter hole. This also acted as a lens hood.

Figures 10 and 11 show the complete system assembled and ready for operation.

Figure 9. Lens reversal arrangement.





Figures 10 and 11. Complete system.

Figure 12. System in operation.

Operation of the developed equipment

Figure 12 shows the prototype system in use. A spotlight is mounted on the wall; this is directed at the upper diffuser panel to provide sufficient light for specimen position adjustment, orientation and fine focusing. Two mirrors strategically placed

behind the flash guns, and can be used to confirm that both guns are fully charged and ready to fire before releasing the camera shutter, as shown by the 'ready lights' on the backs of the flash guns. The camera viewfinder indicator cannot be used for this because it will indicate ready-to-fire with only one of the flash guns fully charged. The wall-mounted spot light is switched off prior to releasing the camera shutter.

Fine focusing is usually carried out with the top diffuser panel removed and the camera objective lens wide open. When using high magnifications, additional fibre-optic illumination is used to illuminate the specimen during focusing; it is then removed prior to shutter release. When correct focus has been achieved, the lens is then stopped down when manual or reversed lenses are being used, and the top Diffuser Panel replaced before releasing the shutter.

Several photographic grey card insect stages were made to enable insects prepared in different ways to be photographed; this enables side-pinned, top-pinned, carded and pointed insects to be photographed in different orientations, either completely or partially, normally or inverted. Most whole insects are photographed using the 50 mm and 38 mm Olympus Macro lenses and modest length extension tubes.

When using Fuji Velvia 50 ASA film, correctly exposed photographs are obtained with both the 50 mm and 38 mm Macro lenses stopped down to their minimum apertures, f/22 and f/16 respectively, over a range of extension tube lengths up to 100 mm. With the 20 mm Macro lens, the minimum aperture of f/16 is usable with extension tube lengths up to approximately 40 mm, f/11 up to approximately 90 mm, reducing to only f/4 at an extension tube length of 200 mm.

For maximum magnification, short focal length lenses in combination with long extension tube lengths are required. The maximum magnification obtained to date has been achieved using a 20 mm Olympus Macro lens and 200 mm extension tube. This gave an image 20 times life size on the slide, the lens being stopped down to f/8 when using Fuji Provia 100F film. However the resulting small depth of field in these circumstances makes satisfactory photography of highly curved small insects or parts of insects difficult to achieve. Currently experiments are in hand with the use of Fuji Provia 100F film rated at 400ASA and 'push' processed by two stops, thus allowing the use of the lens fully stopped down to f/16 for maximum depth of field.

With the Olympus system, correct exposure is indicated by a flickering of the 'flash ready' light immediately on releasing the shutter. Trials indicate that in practice correctly exposed slides are always achieved with the lens stopped down by one stop further than that required to indicate correct exposure in the viewfinder. It is suspected that the Olympus system triggers the flickering of the 'flash ready' light when the camera's automatic exposure system attenuates the flash duration to achieve correct exposure. Thus when the flash guns only just provide sufficient light to correctly expose the film, attenuation is not imposed by the camera system and the 'flash ready' light does not flicker.

From time to time it is necessary to apply more intense illumination to small parts or areas of specimens, in order to show details of structure, colour and pollination. This is usually associated with the use of high magnifications. Figure 13 shows the set-up used for photographing the diagnostic glossy propodeum of the female mason bee *Osmia xanthomelana* Kirby. The rear right-hand reflecting panel was removed to allow access for the fibre-optic directed lighting, the specimen was inclined nose-down on the photographic grey staging card and the fibre-optic light directed at the correct angle to achieve the desired presentation. In this case the Olympus 38 mm Macro lens was used together with a 100 mm Extension Tube at f/11 on Fuji Provia 100F film. The camera shutter speed was set manually at 1 second to produce the best highlight exposure; it is not possible to use the camera's automatic exposure

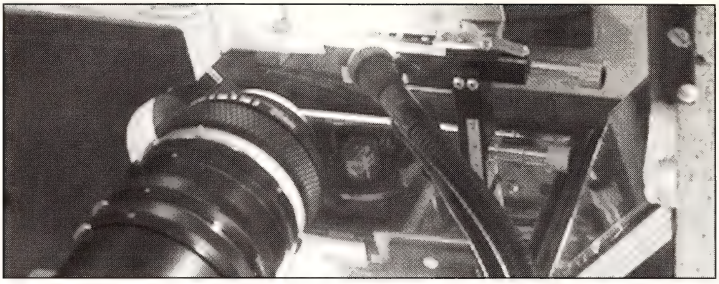


Figure 13. Special illumination with additional fibre-optic directed lighting.

system in these circumstances. Stability of the light diffuser precludes the use of the lightweight rear reflecting panels, described earlier, in these applications.

Photographs of a mixed batch of 36 insects of various sizes from 2 mm to 100 mm in body length, which require changes in extension tube lengths and lenses, can typically be taken in less than two hours. Extension tube lengths and lens combinations are selected to fill 80% of the picture area.

Digital photography

A paper on the development of equipment for the digital photography of set specimens, completed at Liverpool Museum this year, using a Nikon 995 camera will be published in a future part of the journal.

THE SOUTHERN OAK BUSH-CRICKET, *MECONEMA MERIDIONALE* COSTA (ORTHOPTERA: TETTIGONIIDAE) NEW TO BRITAIN

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Abstract. The southern oak bush-cricket, *Meconema meridionale* Costa, not previously known in Britain, was discovered at three separate localities in southern England in the autumn of 2001. At least one and probably two of the sites have an established colony. One male specimen was kept in captivity for eight weeks, feeding on dead insects, and its drumming and mating behaviour observed.

INTRODUCTION

Meconema meridionale is a species from the Mediterranean region of southern Europe whose range has been extending northwards over the last 40 years. It is a pale green bush-cricket resembling our common species, the oak bush-cricket *Meconema thalassinum* (Degeer), but has only tiny scales in place of wings (Fig. 3). There are further small structural differences. For instance, the ovipositor of female *meridionale* is shorter (7.5 mm) than in the common species (9 mm) (Fig. 2), but, conversely, the cerci ('tails') of the male are longer (4 mm instead of 3 mm) (Fig. 1).

My first encounter with this insect was on a field trip through southern France organised by the Orthopterists' Society, an international body for all those who specialise in grasshoppers and crickets. It followed the triennial conference of the Society held in Montpellier in late August, 2001.

In the centre of the historic small town of Espalion, on the River Lot, a green bush-cricket was seen on the ground of a roadside parking-bay beneath a silver maple, *Acer saccharinum* L. On picking it up, I was delighted to find that it was not the expected *Meconema thalassinum* but a female *M. meridionale*. My joy at this discovery was observed with great amusement by two girls sitting at a pavement café, so our leader, Michel Lecoq, went over to explain. "Vous avez assistez à un moment historique", he said, and for me personally it was indeed a historic moment they had witnessed. The resulting conversation was too rapid for me to follow, but it later transpired that the girls, like sentimental young people the world over, had requested that we did not kill the insect. Fortunately, this agreed with my intention, which was to retain the creature in captivity in order to observe its behaviour. All went well with this plan until a week after my return, when its life came to an unfortunate end. When the lid of its box was lifted in order to insert fresh leaves, it escaped and disappeared, being found 20 seconds later in a bowl of hot, soapy water awaiting the weekly wash. No amount of poking, drying or other form of artificial resuscitation could restore it to life. The premature death of this small creature cast a cloud over my life, but this particular cloud had an extremely silver lining, for within a week the dead French female was replaced in its box by a male of British origin.

THE DISCOVERY

On 15.ix.2001 I returned to the railway station at Thames Ditton, Surrey, after a long day spent searching for insects. Since no train was due, further recording was possible and, with the last stroke of the day, I beat a green bush-cricket from a birch

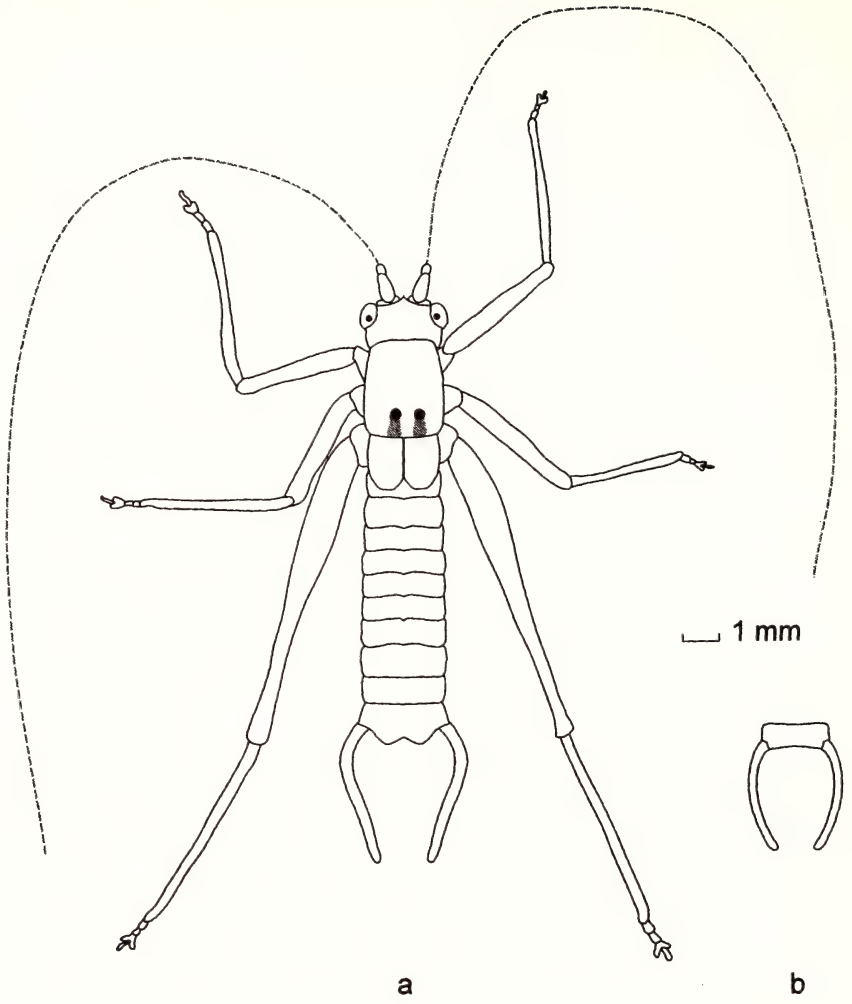

Fig. 1. Male from above. a. *M meridionale*. b. Cerci of *M. thalassinum*.

tree growing in a garden but overhanging the path known as Church Walk, near the station (TQ157670). It jumped rapidly from side to side and off the beating tray, narrowly escaping being squashed as a boy trundled past with a barrow. This active behaviour reminded me strongly of specimens seen in France and I took care to recapture it, finding that it was indeed a male *Meconema meridionale*.

I made further searches of the same general area on 28.ix and 16.x, both by day and by night, but, perhaps crucially, did not try beating the same birch tree again. A total of eight *M. thalassinum* were seen laying eggs on the trunks of various roadside trees, as were two speckled bush-crickets, *Leptophyes punctatissima* (Bosc), one on

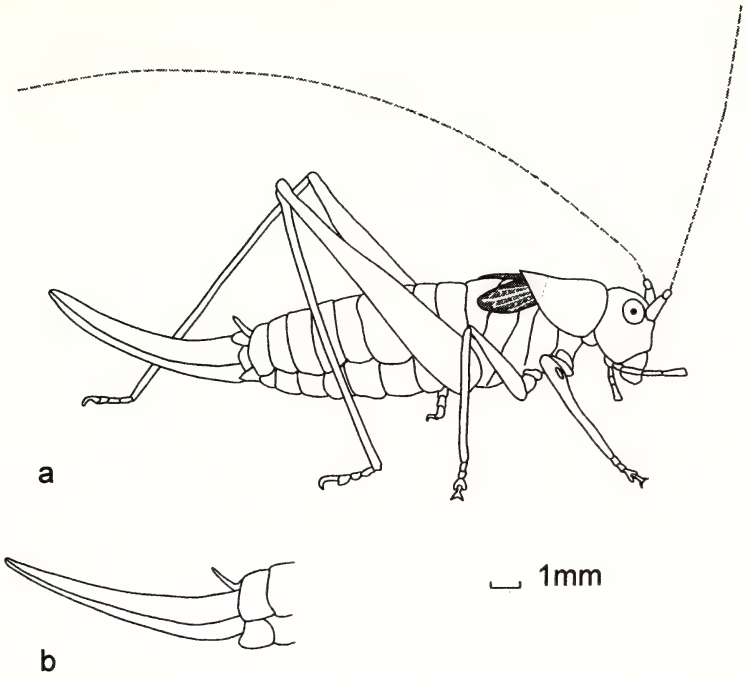

Fig. 2. Female in profile. a. *M. meridionale*. b. Ovipositor of *M. thalassinum*.

each evening. This latter species is just as common as *Meconema* but its oviposition behaviour is much more rarely observed.

In the absence of further specimens of *M. meridionale*, it seemed that the single male might have been a primary migrant to Britain or perhaps a wanderer from a colony elsewhere in southern England, rather than being bred locally in the private gardens of Church Walk which border on a cemetery and the grounds of a school. This speculation was rendered irrelevant by subsequent events.

Colonies found

While in captivity, the male from Thames Ditton was shown at a meeting of the Croydon Natural History and Scientific Society and at the Annual Exhibition of the Amateur Entomologists' Society. Several entomologists of my aquantance were honest enough to admit that they might previously have overlooked this species as a nymph of *M. thalassinum*. One of these was Derek Coleman, who proceeded to discover a thriving colony of *M. meridionale* in his own garden at Carshalton, in the London borough of Sutton but the vice-county of Surrey (TQ275639). He had recently moved into a single-storey building in the grounds of a large house, now divided into flats. The trees in the garden include four sycamores with contiguous crowns but well-separated trunks. A female *meridionale* was captured on one of these trunks on 18.x.2001, two more were seen on 19.x and, when I visited the site on 20.x,

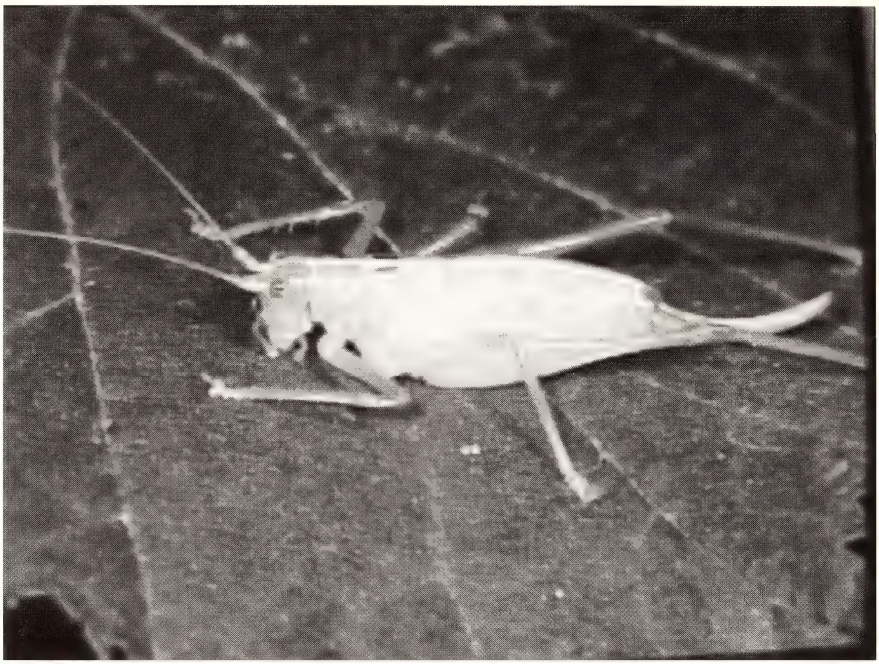

Fig. 3. Southern oak bush-cricket, *Meconema meridionale* Costa (Orthoptera: Tettigoniidae).

there were five females on the trees as well as two in captivity. Five of these seven females were observed laying eggs into cracks in the trunks. During the weeks that followed, further sightings were made at intervals during periods of mild weather, all on the same four sycamore trees. On two occasions a male was seen – one was captured on 6.xi and shown as a live specimen at the Annual Exhibition of the British Entomological and Natural History Society (Coleman, *in press*). There were still three females on the trunks on 17.xi and the colony persisted at least until 19.xi.2001.

On the same day that the colony in Carshalton was discovered, I showed photographs of *M. meridionale* and related species to my sister, Frances Kearsey. Within two days (20.x.2001) she found the new species in her own garden in Maidenhead, Berkshire (SU865794). A female *M. meridionale* was rescued from beneath her husband's paintbrush as he worked on the front of the house. The identification was confirmed by local entomologist Bernard Verdcourt who kindly arranged for the specimen to be delivered to me as a possible mate for my male. A further female was seen on 7.xi.2001 at the same spot, where a birch tree grows close to the wall of the house. We later learnt that my nephew Andrew Kearsey, who was away at university during October and November, had found a male bush-cricket on the house in mid-September and attempted to identify it using *The Oxford Book of Insects* (Burton, 1968). It did not match any of the species illustrated and was dismissed as an apparent nymph of *M. thalassinum*. In retrospect, this was probably

a male *meridionale*, and the three records from the site indicate the presence of a breeding colony.

Behaviour in captivity

The captive male was kept in a transparent plastic box of sufficient size for it to move around (14 cm × 9 cm × 6 cm), with a spray of leaves for it to walk on and hide behind. At first, no food was given beyond a small twist of wet tissue-paper for drinking, in the vain hope that it might find sufficient nourishment from small creatures on the leaves, although none of these were evident. After a week in captivity, I discovered it one evening eating small round holes in birch leaves. This was surprising since *Meconema* is generally held to be completely carnivorous. During the following morning the insect was very active when it would normally have been resting behind a leaf. I concluded that this aberrant behaviour was a mark of desperate hunger and resolved to offer it dead insects, of which I had a plentiful supply in the deep-freeze. The first was a green lacewing, *Chrysoperla carnea* (Stephens), which seemed a suitably juicy morsel. The bush-cricket found this within a few seconds and fed on it greedily, consuming the whole insect apart from some fragments of wings. After examining another dead lacewing, it then settled down under a leaf for the rest of the day. Further lacewings were provided at intervals, and then a succession of dead flies of the families Syrphidae, Tipulidae, Rhagionidae and even the bristly Tachinidae, all of which were nibbled to some extent. Later in its life, this male bush-cricket refused food and became very lethargic, eventually dying on 11.xi after eight weeks in captivity.

The species of *Meconema* do not rub their wings together to make an audible chirp, as do most other bush-crickets, but drum with their hind legs on the substrate, usually a leaf. This drumming was observed briefly on three occasions (2.x, 27.x and 28.x), both shortly after dusk and in the early morning. With one hind leg extended and the other drawn up beneath its body, the male insect curled its abdomen up in the air and then slammed it down onto the surface below, making an audible "tap - tap - tap - tap" when done on the floor, wall or lid of the plastic box. It could not be heard through the plastic when done on a leaf. Each tap may have been a double note and the tip of the abdomen may have struck the surface as well as the folded leg, but this was difficult to verify. On a later occasion the abdomen moved little and the insect clearly drummed with its leg, making a sequence of between three and seven taps (most frequently six) as it wandered about the box, interspersed with an occasional single tap. This drumming differs in pattern from that of *M. thalassinum* but agrees in general with previous observations of *M. meridionale* (Heller, 1988). As with other aspects of its behaviour, drumming ceased soon after the light in the room was turned on, with the insect retreating under a leaf to resume its daytime rest.

Shortly after the male from Thames Ditton was seen drumming, the female from Maidenhead arrived and was introduced to it but, perhaps surprisingly, nothing happened. Next day they were again put together and again with no effect, although the creatures were clearly aware of each other. Finally, they were left together overnight. Next day, at 7.30 a.m. on 1.xi, the female was found apparently laying eggs on one of several pieces of loose bark that I had provided. On my return home that evening at 6.30 p.m., the insects were mating. The posture was as illustrated by Tauscher (1986). The female sat on a leaf inclined at 20° to the horizontal, facing upwards, and was coupled to the male lying on his back facing away from the female but with his head raised to hold on to the tip of her ovipositor with his mandibles. Further observations were made at intervals, surreptitiously by torchlight. They were

still mating after 10 minutes but had separated after 50 minutes and both insects were eating the remains of the spermatophore, or sperm package that the male passes to the female during mating. The female remained inactive for the rest of that evening and the insects were placed in separate boxes. At dusk next day the female appeared to be laying eggs on a large piece of bark, but during the third day it died unexpectedly. It is difficult to explain how a well-fed insect should die suddenly so soon after a successful mating—perhaps from the first frost of the year on the previous night, or perhaps through loose pieces of bark being unsuitable objects for oviposition. No eggs were immediately obvious on the bark, but the pieces have been retained.

European distribution

Meconema meridionale was described from Italy by Costa in 1860. Over the next hundred years its distribution was ascertained to extend to neighbouring countries: south-eastern France, where it was rare, and the modern countries of Slovenia and Croatia. From 1960 onwards it was also found further north in ever-increasing numbers, firstly in south-west Germany and parts of Austria, then in north-central and eastern France, and finally in Holland, Belgium and some northern regions of Germany during the 1990s (Chopard, 1951; Bellmann & Luquet, 1995; Detzel, 1998, Kleukers *et al.*, 1997).

Many specimens have been found on and around houses, and others seen on cars. It is probable that this flightless species is being carried to new areas on motor vehicles—this has been observed directly in Germany on two occasions. The additional warmth generated by buildings seems to allow this insect to survive far to the north of its original distribution, but there are now records from country areas in the Rhine valley and other parts of southern Germany with a favoured climate (Detzel, 1998).

Comment

The occurrence of this species in neighbouring parts of the Continent, together with its probable spread using motor vehicles, made it highly likely that it would eventually be encountered in Britain. Now that it is here, it may well consolidate its population in the London area, where the extensive suburbs must provide a wealth of suitable habitat, and also spread to other parts of Britain, Maidenhead being already 40 km west of central London. There are likely to be many more colonies in other localities besides the gardens of entomologists and their relatives.

The wildlife of our gardens is often somewhat impoverished and this attractive species makes a welcome addition to this fauna. In the next few years it is important that all specimens of *Meconema* are checked carefully, particularly those found around houses and on motor cars. Publicising the species to non-entomologists may well allow further colonies to be located. Counting specimens at recently-established colonies should determine whether the species has a one-year or a two-year life-cycle. In the latter case, the eggs would pass through two winters before hatching, as occurs in some related species.

The male specimen from Thames Ditton has been placed in the collection of the British Entomological and Natural History Society at Dinton Pastures, together with females from Carshalton and Maidenhead.

Acknowledgements

I am grateful to Derek Coleman for allowing me to publish his observations, which show that the species is now present and breeding in Britain, and to John Widgery for supplying one of the European texts. For illustrating this paper I am deeply grateful to Graham Collins for the drawings and to David Clement for his photograph.

References

Bellmann, H. & Luquet, G. C. 1995. *Guide des Sauterelles, Grillons et Criquets d'Europe occidentale*. Delachaux et Niestlé, Lausanne.

Burton, J. F. 1968. *The Oxford Book of Insects*. Oxford University Press, Oxford.

Chopard, L. 1951. Orthoptéroïdes. *Faune de France* **56**. Lechevalier, Paris.

Coleman, D. A., *in press*. [Exhibit at 2001 BENHS annual exhibition.] *British Journal of Entomology and Natural History* **15**.

Detzel, P. 1998. *Die Heuschrecken Baden-Württembergs*. Ulmer, Stuttgart.

Heller, K.-G. 1988. *Bioakustik der europäischen Laubheuschrecken*. Margraf, Weikersheim.

Kleukers, R., van Nieukerken, E., Odé, B., Willemse, L. & van Wingerden, W. 1997. *De Sprinkhanen en Krekels van Nederland*. KNNV, Utrecht.

Tauscher, H. 1986. *Unsere Heuschrecken*. Franckh, Stuttgart.

SHORT COMMUNICATION

Some insects active during a period of continuous frost in East Sussex—On 27.xii.2000 the weather where I live at Sedlescombe in East Sussex (TQ782188) suddenly turned unusually cold as it did elsewhere in the British Isles. On the afternoon of 30 December, after three days of almost continuous frost, it remained very cold with snow lying on the ground and unmelted on bushes and trees. Although bright and sunny, the soil and the surfaces of our garden ponds were hard frozen and a light but penetrating wind blew from the north. In the shade the temperature remained below freezing and only a small amount of thawing had occurred in the shelter of south-facing hedges in direct sunlight and similar places.

In view of these unpropitious conditions I decided to see if there were any free-flying, or free-moving, adult insects about, or if frost had either killed them or driven them into sheltered nooks and crannies from which they could not easily be disturbed. I used a net that I take on summer surveys and swept around the garden, concentrating on evergreens like holly, box, juniper and ornamental firs where insects usually shelter.

The following day, 31 December, a second walk was taken round the garden at midday. The overnight frost had been just as hard as on the previous three nights, but the temperature had risen a few degrees above freezing by mid-morning and there was a much stronger wind from the south-east. It was a raw, cold winter's day. The many insects collected were much the same species as those of the previous afternoon, with one or two not found before and one or two absent (as one might expect with any survey of this kind).

Many of the species were very tiny and delicate which, perhaps, makes it even more surprising that they were able to survive in such apparently adverse conditions.

The smallest was the springtail *Entomobrya nivalis* (L.) with some examples only just over 1 mm long (I imagine the name *'nivalis'* meaning 'of the snow' was chosen because this species, which is common all year round, was found on snow, a habit well-known among a wide range of Collembola). Chironomids like the 1.6 mm *Gymnometriocnemus brumalis* (Edwards) and the delicate, green *Micropsectra junci* (Meigen) have a slender fragility that seems incompatible with their cold-resistance, but they must have a body chemistry that not only prevents freezing down to at least a modest level of sub-zero temperatures, but allows normal metabolic activity.

In all 20 species of insect were collected, some being present in considerable numbers. Many species of spider were also seen but not identified. The insects were all in an active state and fully capable of flying (or jumping) from the net, though they must have survived three or four nights in the open as it is extremely unlikely that they could have emerged from pupae beneath frozen leaves or under iced ponds. Nearly all are common winter-flying species in our area and often in evidence through their swarming habits in milder weather.

My brief survey in this very cold spell shows that many adult invertebrates are capable of surviving and remaining active during such periods. Thus, while they may not venture forth from the shelter of evergreens and similar places, they retain the ability to avoid predators. As well as being of interest in their own right, these hardy species must represent an important food resource for resident insectivorous birds and spiders.

The following species were recorded: Collembola, Entomobryidae: *Entomobrya nivalis* (L.); Hemiptera, Cicadellidae: *Empoasca vitis* (Göthe); Psyllidae: *Psylla melanoneura* Förster; Triozidae: *Trioza urticae* (L.); Coleoptera, Chrysomelidae: *Aphthona atrocaerulea* (Stephens); Diptera, Trichoceridae: *Trichocera annulata* Meigen, *Trichocera regelationis* (L.), *Trichocera saltator* (Harris); Chironomidae: *Brillia modesta* (Meigen), *Chaetocladius piger* (Goetghebuer), *Gymnometriocnemus brumalis* (Edwards), *Limnophyes habilis* (Walker) (This is the *L. habilis* as defined by Saether (1990) and the *L. truncorum* of many earlier authors) *Micropsectra junci* (Meigen); Bolitophilidae: *Bolitophila saundersii* (Curtis); Mycetophilidae: *Synplasta excogitata* (Dziedzicki), *Exechia ?dorsalis* (Staeger) (♀), *Phronia biarcuata* (Becker), *Mycetophila* (*ruficollis* group) sp. aff. *evanida* Laštovka (♀); Anthomyiidae: *Hylemya nigrimana* (Meigen).

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REFERENCE

Saether, O. A. (1990). A review of the genus *Limnophyes* Eaton from the Holarctic and Afrotropical regions (Diptera: Chironomidae, Orthocladiinae). *Entomologica Scandinavica Supplement* **35**: 1–139. Lund, Sweden.

GYROPHAENA MUNSTERI STRAND (COLEOPTERA: STAPHYLINIDAE) IN HAMPSHIRE AND CARMARTHENSHIRE

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Abstract. The few published records for *Gyrophaena munsteri* Strand in Britain are reviewed. Data on recent captures of the species in England (Hampshire) and Wales (Carmarthenshire) are presented.

Introduction

Gyrophaena munsteri Strand is a very poorly known British species and was given the status of RDBK (Insufficiently Known) by Hyman & Parsons (1994). They cited occurrences in West Sussex, Hertfordshire and Huntingdonshire prior to 1970 and Radnorshire and North Lincolnshire from 1970 onward. There appear to be very few published records of this species in the British literature.

The name was included as British by Kloet & Hincks (1945), who cited Strand's (1935) paper in their bibliography, but seems not to have been referred to in Britain prior to 1945. In the original description of the species, Strand (1935) included four British specimens among the material examined. The specimens were collected by B. S. Williams on 28 and 29 September 1928 from Ivinghoe, Bucks. Specimens from Ivinghoe Heights, collected by P. Harwood on 28.ix.1928 and 19.ix.1931, are present in the British collection, The Natural History Museum.

Although Welch (1970) reported the occurrence of one male and two females in company with *G. pulchella* Heer in sulphur tuft fungus (*Hypholoma fasciculare* Quel.) at the roots of birch at Holme Fen NNR, Huntingdonshire, on 21.ix.1969, collected by T. Payne, the specimens were later redetermined as *G. minima* Erichson (Welch, 1999), so the record must be withdrawn. In the report of the coleopterists' field meeting in Radnorshire (Key, 1986), *G. munsteri* was recorded from Bailey Einon Wood, SO0861, in June 1986; a male was collected there on 7.vi.1986 by A. B. Drane from a gill fungus growing on a stump (Drane, 1987). It was also listed among the Red Data Book Coleoptera recorded from Breckland (Welch & Hammond, 1996); the specimens in The Natural History Museum were collected at Lakenheath, West Suffolk, TL78, on 28.ix.1969. Although the pre-1970 record for Huntingdonshire must be deleted, it has been found in the county twice in recent years. Specimens were found in *Polyporus squamosus* growing on a rotten, fallen elm in Little Paxton Wood, TL169634, on 11.v.1997 (Welch, 1998) and also on *P. squamosus* growing at the base of a fallen ash in Monks Wood NNR, TL194794, on 25.v.1998 (Welch, 1999).

New records

It is therefore of interest to report three other recent records, one each from both South and North Hampshire and Carmarthenshire (vice-counties 11,12 and 44), extending the species range to the south and west in Britain. A single male specimen was collected in one of two window-type flight interception traps placed next to fallen oak and beech trees in mature woodland at Bramshaw, New Forest, SU2515, from

20–23.v.1999 by R. G. Booth. Two male specimens, one determined by R. G. Booth, were collected from *Trametes*-like soft brackets growing on fallen beech logs at Ackender Wood, Beech, North Hampshire, SU6938, on 13.xi.1999 by J. S. Denton.

B. Levey collected two male specimens from *Hypholoma fasciculare* on a very rotten, fallen tree trunk on 1.x.1996 at Dinefwr Deer Park, Carmarthenshire, SN6122, and a further two specimens, determined as *?munsteri*, from *Polyporus sulphureus* on a dead tree trunk on 11.x.1996. These Dinefwr specimens were collected as part of a survey of invertebrates of Welsh parklands undertaken by B. Levey and others on behalf of the Countryside Council for Wales, and were initially determined by S. A. Williams

Almost all of the above specimens of *G. munsteri* were collected in company with other *Gyrophaena* species, including *G. latissima* (Stephens), *G. minima* Erichson and *G. affinis* Mannerheim. The male genitalia drawings in Palm (1968) were found to be easier to interpret than those in Freude, Harde & Lohse (1974) when the Hampshire specimens were first determined. A key to the British species was provided by White (1977), relying on external characters, but male genitalia should be studied for critical determinations.

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References

Drane, A. B. 1987. [1986 Annual Exhibition: Coleoptera]. *Proceedings and Transactions of the British Entomological and Natural History Society* **20**:62–63.

Freude, H., Harde, K. W. & Lohse, G. A. 1974. *Die Käfer Mitteleuropas*, vol. 5. Goecke & Evers, Krefeld.

Hyman, P. S. & Parsons, M. S. 1994. *A review of the scarce and threatened Coleoptera of Great Britain, Part 2*. UK Nature Conservation 12. Joint Nature Conservation Committee, Peterborough.

Key, R. S. 1986. Radnorshire field meeting 6th–8th June 1986. *The Coleopterist's Newsletter* **26**: 17–22

Kloet, G. S. & Hincks, W. D. 1945. *A check list of British insects*. Kloet & Hincks, Stockport.

Palm, T. 1968. *Svensk Insektfauna, 9 Skalbaggar Coleoptera, Kortvingar: Fam. Staphylinidae*. Häfte 5, Underfam. Aleocharinae (*Deinopsis–Trichomicra*). Entomologiska Föreningen i Stockholm, Stockholm.

Strand, A. 1935. Die nordischen *Gyrophaena* Mannh. (Col. Staph.), mit Beschreibung von zwei neuen Arten. *Norsk Entomologisk Tidsskrift* **3**: 395–404.

Welch, R. C. 1970. Recent Coleoptera records for Huntingdonshire. *Annual Report of the Huntingdonshire Fauna and Flora Society* **22**[1969]: 20–22.

Welch, R. C. 1998. Further notable Coleoptera recorded from Huntingdonshire and the Soke of Peterborough during 1996 and 1997. *Annual Report of the Huntingdonshire Fauna and Flora Society* **50**[1997]: 27–31.

Welch, R. C. 1999. Notable Coleoptera recorded from Huntingdonshire and the Soke of Peterborough during 1998. *Annual Report of the Huntingdonshire Fauna and Flora Society* **51**[1998]: 16–21.

Welch, R. C. & Hammond, P. 1996. Breckland Coleoptera. In: Ratcliffe, P. & Claridge, J. (eds) *Thetford Forest Park: the ecology of a pine forest*. Forestry Commission Technical Paper 13, pp. 92–102. Forestry Commission, Edinburgh.

White, I. M. 1977. The larvae of some British species of *Gyrophaena* Mannerheim (Coleoptera: Staphylinidae) with notes on the taxonomy and biology of the genus. *Zoological Journal of the Linnean Society* **60**: 297–317.

MICHAELOPUS SPINITARSIS FAIN (ACARI: ACARIDAE): A FIRST RECORD IN THE BRITISH ISLES

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Abstract. The mite *Michaelopus spinitarsis* Fain is recorded in the British Isles for the first time, collected from within the decaying branch of an apple tree in North Yorkshire. Additional measurements are given for the female. All other developmental stages are described for the first time and measurements given. Examination of the phoretic nymphal stage, or hypopus, indicates that *Michaelopus johnstoni* Fain may be synonymous with this species. The distribution and known developmental stages of the 21 nominal species are tabulated.

INTRODUCTION

On the 31.iii.1998 a large number of mites of one type were collected from within the decaying branch of an old apple tree in the village of Burythorpe in North Yorkshire (SE 793646). The internal tissues of the branch were well decayed, spongy in texture, heavily infiltrated by fungi and showing signs of previous habitation by wood-boring insects. The feeding activity of the mites had resulted in long narrow galleries being formed in the wood immediately under the bark. The older galleries were filled with mite faecal pellets and debris. These observations correspond closely with those made by Michael (1903), when referring to the feeding activities of *Histiogaster corticalis* (Michael) (*Michaelopus corticalis* (Michael)) within the leaves of *Arundo phragmites* L. When examined under the microscope, the gut contents of the mites were clearly visible, consisting of pieces of fungal hyphae mixed with fragments of substrate.

Females were identified as *Michaelopus spinitarsis*, the identification being verified by Dr Anne Baker of the Natural History Museum, London (NHM). Prior to this record *M. spinitarsis* was known only from a single female specimen collected from humus in the Forêt de Soignes, near Brussels, Belgium (Fain, 1982). This species is recorded here for the first time in the British Isles, and all the previously unknown developmental stages are described.

The genus *Michaelopus* was erected by Fain & Johnston (1974), who designated *Tyroglyphus corticalis* Michael, 1885 as the type species. One hypopus was designated as a lectotype and three others as paralectotypes from the original material deposited in the NHM. In the same paper *Michaelopus sminthurus* Fain & Johnston, 1974 was described from a single hypopus collected in England, found on the collembollan *Sminthurus fuscus* L.

The review of the genera *Michaelopus* and *Thyreophagus* Fain (1982) lists fifteen species and one subspecies of *Michaelopus*. Three, namely *M. angusta* (Banks, 1906), *M. berlesiana* (Zachvatkin, 1941) and *M. magna* (Berlese, 1910), were considered to be of uncertain status, as the reviewer was unable to examine the original material and the existing descriptions were considered insufficient. Since 1982 five new species have been described and a sixth transferred from the genus *Moniesiella* Berlese, 1897 (Klimov, 1998), thus making a total of 21 nominal species in the genus.

Distribution and ecology

Geographically the genus is widespread, being recorded from all continents with the exception of Antarctica and Australia (Table 1). Seven species have been recorded from the British Isles, collected from the following counties: *M. corticalis* from Dorset, Kent, Nottinghamshire and Warwickshire; *M. evansi* Fain from County Wexford, Republic of Ireland; *M. macfarlanei* Fain from Hertfordshire? (collected from UK wheat destined for export, origin not known); *M. sminthurus* from Nottinghamshire; *M. spinitarsis* from North Yorkshire and *M. vermicularis* (Fain & Lukoschus) from the Scilly Isles. MacQuillan (1967) records *M. berlesiana* from County Armagh in Northern Ireland, a species, as previously mentioned, that is considered to be of uncertain status (Fain, 1982). The distribution of these species is not fully known, but it is likely that they are far more widespread than the present records indicate.

Ecologically these mites have been found in a wide range of habitats; the adults have been found in decaying plant material, flowers, fungi, soil, house dust, flour, leaf litter, birds' nests and associated with a range of homopteran species. The hypopi of many species have been found attached to a number of different vertebrates and invertebrates. The known records have been comprehensively summarised by Klimov (1998).

None of the described species are at present thought to be of economic importance, although it has been demonstrated that *M. corticalis* (Michael) is capable of

Table 1. *Michaelopus* Fain & Johnston. Known life stages and geographic distribution

Species	F	M	L	P	T	H	Distribution
annae Sevastianov & Kivganov, 1992	•	•					Ukraine
africanus Mahunka, 1973						•	Ghana
athiasae Fain, 1982	•						France
corticalis (Michael, 1885)	•	•		•	•	•	United Kingdom, Belgium, Germany
evansi Fain, 1982	•	•					Republic of Ireland
gallegoi (Portus & Gomez, 1980)	•	•					Spain
subsp. *mauritianus* Fain, 1982	•						Mauritius
incanus Fain, 1987	•	•					Colombia
johnstoni Fain, 1982						•	USA
leclerqui Fain, 1982						•	Belgium
longirentinalis Klimov, 1998						•	South Korea
macfarlanei Fain, 1982	•						United Kingdom
passerinus de la Cruz, 1990	•	•	•	•			Cuba
polezhaevi (Zachvatkin, 1953)						•	Russia?
rawandus Fain, 1982						•	Rwanda
sminthurus Fain & Johnston, 1974						•	United Kingdom
spinitarsis Fain, 1982	•	*	*	*	*	*	Belgium, United Kingdom
tridens Fain, 1986		•					USA
vermicularis (Fain & Lukoschus, 1982)	•						United Kingdom (Scilly Isles)
augusta (Banks, 1906)	?	?					USA
berlesiana (Zachvatkin, 1941)	•	•					Italy
magna (Berlese, 1910)	•					•	Italy

Female (F), Male (M), Larva (L), Protonymph (P), Tritonymph (T), Hypopus (H). *Described in this paper.

dispersing virulent and sub-virulent spores of *Cryphonectria parasitica* (Murr.) Barr (Nannelli & Turchetti, 1989). This fungus induces cankers in chestnut trees.

Description

In life these mites are shiny, varying in colour from a translucent pale yellow in the juvenile stages (with the exception of the hypopus which is entirely pale yellowish brown) to a waxy-white in the adults, that have pinkish-brown appendages and apodemes (apodemes are ridges of thickened cuticle that run from the bases of the legs towards the centre of the body, and serve as sites for the attachment of muscles).

The most noticeable features of these mites are their elongate shape being up to three times longer than wide, bearing inconspicuous body setae and with the first two pairs of legs being widely separated from the second two pairs.

The width of the adults is close to that of the galleries in which they were found. This suggests that apart from their feeding activity, the overall proportions of the mites had a bearing on the way in which the galleries were formed.

M. spinitarsis was described from a single female. The specimens collected in Burythorpe allow all stages to be described and give an indication of the range of morphological variation exhibited by this species, albeit from a single population. Forty-eight specimens were mounted on nine microscope slides (6 larvae, 22 protonymphs, 1 tritonymph, 13 females, 1 male and 5 hypopi) in Heinz media. Following the convention of previous authors e.g. Fain, 1982, various structures were measured. Some of the mounted specimens were found to be orientated in such a way as to prevent accurate or complete measurements from being taken. It was however possible to measure the two largest and smallest examples of each life stage, where available, to cover the size range in the sample. All measurements are given in microns (μ).

Female: (4 specimens) Idiosoma, length 570–672, width 225–264; Dorsal shield, length 107–112, width 100–105; Setae *v1* 40–64, *sae* 62–86, *scz* 24–26, *d4* 52–56, *d5* 130–140, *l1* 56–65, *l2* 46–50, *l3* 62–84, *l5* 82–86, *a1* 58–62; Length of tarsi: I–IV 19.4–23.6; 18.0–24.3; 16.6–17.3; 16.6–18.7. Chaetotaxy: Tarsi 4:4:3:3, Tibiae 2:2:2:1, Genua 2:2:0:0, Femora 1:1:0:1, Trochanters 1:1:1:0; Solenidia, tarsus I, $\omega 1$ 16.4, $\omega 2$ 11.4, $\epsilon 3.6$, tibia I, ϕ 67.8–89.2, tibiae II, III, IV: 78.5–92.8: 82.8–91.4: 32.8–38.5 respectively, genu I $\sigma 1$ 22–22.8, and $\sigma 2$ 16.4–18.5.

Male: (1 specimen) Idiosoma, length 375, width 190; Dorsal shield length 63.3, width 53.3; Setae *v1* 30, *sce* 65, *d4* 28.3, *d5* 51.6, *l1* 45.8, *l2* 21.6, *l3* 50, *l5* 40; Adanal suckers, width 20.7, Genitalia, 18.8 × 18.8; Length of tarsi: I–IV 15; 15; 13.3; 13.3. Chaetotaxy: As for the female; Solenidia tarsus I, $\omega 1$ 10.7 cylindrical, with a bulbous, egg-shaped apex, $\omega 2$ 8.9 uniform, thin; ϵ 2.1, tibia I ϕ 53.5, solenidia on tibiae II, III 50 and 47.8 uniform, IV 3.5 conical, genu I $\sigma 1$ 23.5 and $\sigma 2$ 14.3

Larva: (4 specimens) Idiosoma, length 171–206, width 81.6–86.6; Dorsal shield, length 41.6, width 41.6–46.6; length of tarsi I–III: 9.1–10.8; 9.1–10.0; 8.3–9.1. Chaetotaxy: Tarsi 3:3:3, Tibiae 2:2:1, Genua 2:2:0, Femora 1:1:0, Trochanters 0:0:0. Coxal rods 7.8 long, 3.6 wide, uniform, ends smoothly rounded, each with two concentric furrows.

Protonymph: (4 specimens) Idiosoma, length 345–470, width 105–210; Dorsal shield, length 53–63.3, width 50–58.3; Length of tarsi I–IV: 10–13.3; 10–15; 8.3–10; 8.3–10. Chaetotaxy: Tarsi 3:3:3:3, Tibiae 2:2:1:0, Genua 2:2:0:0, Femora 1:1:0:0, Trochanters 0:0:0:0.

Tritonymph: (1 specimen) Idiosoma, length 535, width 230; Dorsal shield, length 66.6, width 68.3; Length of tarsi I–IV: 18.3; 18.3; 14.1; 14.1. Chaetotaxy: Tarsi 4:4:3:3, Tibiae 2:2:1:1, Genua 2:2:0:0, Femora 1:1:0:1, Trochanters 1:1:1:0.

Hypopus: (4 specimens) Length 230–263, width 123–171 (ratio 1:1.50–1.87); Propodosoma 83–91.6; Hysterosoma 138–175 (ratio 1:1.5–2.2); Eye separation 33–50; Eye diameter 16.6–18.3; Length of tarsi: I–IV 28–33; 25–25; 13.3–16; 13.3–16. Chaetotaxy: Tarsi 8:8:8:8, Tibiae 2:2:1:1, Genua 2:2:0:0, Femora 1:1:1:0, Trochanters 1:1:1:0. Solenidia, Tarsus I, *ω1* 20.7 long, thin, with bulbous apex, *ω2* 20.7 long, thin, uniform, *ω3* 7.1 long, thin, uniform; ϵ 2.8 long conical, sharply pointed.

Discussion

The measurements given for the holotype of *M. spinitarsis* generally fell within the ranges recorded here, with the following exceptions. In the Burythorpe population, setae *l5* are 36–43% longer, tarsi IV are 18–33% longer and the propodasomal shields are slightly larger in both dimensions. The hypopi key out as either *M. corticalis* or *M. johnstoni* Fain, although they more closely resemble *johnstoni* in overall proportions, particularly the robustness of the apodemes and in the sizes of the measured structures.

The main characters used by Fain (1982) to differentiate between the adults of six *Michaelopus* species included: the proportions and ornamentation of the propodosomal shield, shape and structure of the spermatheca, shape of setae *d5* and *l5* and the number of tarsal spines. Some measurements are also given, but it is questionable how useful these are when we consider that many species are known from a limited number of specimens, e.g. *M. spinitarsis* was described from a single female. There is therefore no measure of the range of variability. In the same paper a key is provided to the hypopal stages of six species of *Michaelopus*, that is even more reliant on measurements than the adult key, but which is also based on the examination of a limited number of specimens. Ideally, and when possible, a range of specimens should be examined and measured when a species is described in order to take account of any variability.

The females collected in Burythorpe are clearly *M. spinitarsis* whilst the hypopi more closely resemble *M. johnstoni*. It appears from this evidence that the two species are synonymous, but further specimens need to be studied to confirm this. If synonymy were to be proven the name *spinitarsis* should be adopted as this has page precedence. In future other cases of synonymy may be found, as there are at present ten species of *Michaelopus* known solely from a single developmental stage (three from adults and seven from the hypopi). Five slides consisting of 18 specimens are deposited at the CSL, and four slides consisting of thirty specimens, including the single male and tritonymph, are deposited in the collection of the NHM, London.

Acknowledgement

Thanks to Dr Anne Baker for confirming the identification of my specimens.

References

Banks, N. 1906. A revision of the *Tyroglyphidae* of the United States. *U.S. Department of Agriculture. Technical series*, no. 13, Washington, 1–33.

Berlese, A. 1897. Ordo Cryptostigmata (Sarcoptidae). *Acari Myriapoda et Scorpiones huiusque in italia reperta*. Portici, 1–190, Tabl. I–XV.

Berlese, A. 1910. Brevi diagnosi di generi e speci nuovi de acari. *Redia* **6**: 346–388.

Cruz, J. de la. 1990. Acaros nidícolas de Cuba. I. Nueva especie del género *Michaelopus* Fain *et* Johnson, 1974 (Acari, Acaridae). *Poeyana* No. 399: 1–6.

Fain, A. 1982. Révision des genres *Thyreophagus* Rondani, 1874 et *Michaelopus* Fain & Johnston, 1974 (Acari, Acaridae) avec description de neuf espèces nouvelles. *Bulletin de L'institut Royal des Sciences Naturelles Belgiques Entomologie* **54** (7): 1–47.

Fain, A. 1987. Notes on the mites living in the flowers of *Espeletia* spp. (Asteraceae) in Colombia. II. *Espletiacarus andinus* gen.n., sp.n. (Hemisarcoptidae) and *Michaelopus incanus* sp.n. (Acaridae). *Entomologische Mitteilungen Zoologischen Museum Hamburg* **9** (130): 34–47.

Fain, A. & Johnston, D. 1974. Three new species of hypopi phoretic on Springtails (Collembola) in England (Acari: Acaridae). *Journal of Natural History* **8**: 411–420.

Fain, A. & Lukoschus, L. S. 1986. *Michaelopus tridens* spec. nov (Acari, Acaridae) from a North American rodent. *Bulletin de L'institut Royal des Sciences Naturelles Belgiques Entomologie* **56**: 55–57.

Klimov, P. 1998. *Michaelopus longiretinalis* sp. nov. (Acari, Acaridae), a new species of mite associated with beetle *Onthophagus lenzi* (Coleoptera, Scarbaeidae) from South Korea. *Acarina* **6**: 17–19.

Mahunka, S. 1974. Auf Insecten lebende Milben (Acari: Acarida, Tarsonemida) aus Afrika. IV. *Acta Zoologica Academiae Scientiarum Hungaricae* **29**: 367–402.

Michael, A. D. 1885. Notes on the life-histories of some little known Tyroglyphidae. *Journal of the Royal Microscopical Society, ser* **2**. vol. v. 27–31, pl. iii, figs 1–14.

Michael, A. D. 1903. *British Tyroglyphidae*. Vol. II. The Ray Society. London. pp. 183.

Nannelli, R. & Turchetti, T. 1989. Preliminary observations on the association of some species of corticolous Acari with *Cryphonectria parasitica* (Murr.) Barr. *Redia* **72** (2): 581–593.

Portus, M. & Gomez, M. S. 1980. *Thyreophagus gallegoi* a new mite from flour and house dust in Spain. *Acarologia*, **21**, 477–486.

Sevastyanv, V. D. & Kivganov, D. A. 1992. Review of the genus *Michaelopus* (Acari, Acaridae) of the world fauna with description of new species. *Vestnik zoologii* **2**: 25–30.

Zachvatkin, A. A. 1941. Tyroglyphoidea (Acari). *Fauna of the U.S.S.R.*, Arachnoidea **5** (1): pp. 573. English translation, Washington.

Zachvatkin, A. A. 1953. Investigations on the morphology and postembryonic development of tyroglyphoid mites (Sarcoptiformes, Tyroglyphoidea). In: A. A. Zachvatkin. *Shornik nauchnykh rabot. M.S.* 19–118.

SHORT COMMUNICATION

Grass-mowing machinery, an important cause of stag beetle mortality in a south London park.—Those of us living in south-east London are fortunate enough to find stag beetles, *Lucanus cervus* L. (Coleoptera: Lucanidae), regularly most years. Here, this supposedly nationally scarce species (notable B, Hyman & Parsons, 1992) is common and widespread, in parks, gardens, woods and verges. It is often noticed by non-entomological friends and neighbours who, awed by the male's wondrous antlers, are concerned to seek expert advice on its potential pest status or desperate assistance against what they fear may be a dangerous animal.

The beetle's distribution was recently the subject of the "great stag hunt", a nationwide survey drawing on records from the general public as well as from entomologists (Anon, 1999; Napier, 1999; Frith, 1999). Apart from live specimens found crawling on logs and tree trunks or seen flying in early evening and the larvae found under logs, the clearly recognizable remains of dead specimens are often discovered; these remains in particular demonstrate just how widespread this magnificent creature is in the area.

Occasionally more-or-less complete dead specimens are found, of either sex, some apparently without injury and some, the victims of cars and lorries, completely crushed on roads, but more usually odd broken parts are seen. Typical

Fig. 1. Remains of at least 10 stag beetles, thought to comprise 6 males and 4 females, found at the edge of a mown playing field where it met woodland, Forster Memorial Park, Catford, south London, 17.vi.1999. They are thought to be the victims of tractor-drawn grass-mowing machinery. Scale bar = 30 mm.

fragments to be found are single elytra and loose head capsules. However, on 17.vi.1999, while visiting a south-east London park a large number of broken remains were found in an extremely limited area, suggesting that some unusual agent had been at work.

Forster Memorial Park, in Catford, south London (TQ387723), is a mixture of what seems to be old, even possibly ancient woodland, around the edge of utility-mown playing fields. On the visit in question, the first find of the day was a large whole female stag beetle, dead on a narrow footpath, seemingly crushed under foot. A short distance away a single elytron was the first of at least 10 dead specimens, thought to comprise 6 males and 4 females (Fig. 1), found within 20 minutes along a 10-metre stretch of playing field where it abutted the woodland (Fig. 2). All were within 3 metres of the woodland edge. A zig-zag walk across and around the entire playing field failed to produce any other specimen.

Finding the beetle remains in one place at first suggested that a predator had been at work, and sure enough a magpie, a bird species implicated as a major predator (Anon, 1999; Napier, 1999), was seen walking in this area. But the

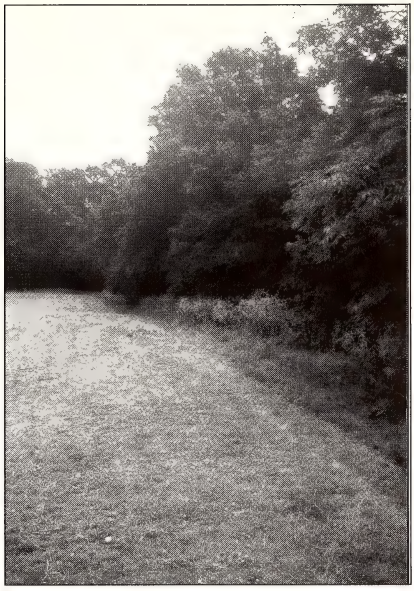

Fig. 2. Woodland edge of Forster Memorial Park, Catford, showing the freshly mown grass and small piles of grass cuttings.

discovery of two still-living (barely) half beetles inside small mounds of fresh grass cuttings implied another explanation—that the beetles had been mangled by the passage of tractor-drawn grass-mowing machinery. The grass cuttings were fresh, less than 24 hours old, and the field was probably mown earlier that same day; it is quite conceivable that the dismembered insects could survive for this short period.

Further examination of the collection of beetle remains showed more evidence of extreme cutting force: several elytra cut in half and the large male antlers cleanly cut right through (Fig. 1, bottom left specimen). It is difficult to conceive of a bird or animal attack which would result in the last-mentioned damage.—RICHARD A. JONES, 135 Friern Road, East Dulwich, London SE22 0AZ. (bugmanjones@hotmail.com)

REFERENCES

Anon. 1999. *National Stag Beetle Survey Update*. London: People's Trust for Endangered Species.

Frith, M. 1999. A survey of the stag beetle *Lucanus cervus* in south London during 1997. *London Naturalist* **78**: 125–133.

Hyman, P. S. & Parsons, M. S. 1992. *A review of the scarce and threatened Coleoptera of Great Britain. Part 1*. UK Nature Conservation Number 3. Peterborough: Joint Nature Conservation Committee.

Napier, D. 1999. The 1998 National Stag Beetle Survey—preliminary findings. *Antenna* **23**: 76–81.

SHORT COMMUNICATION

Napomyza elegans* (Meigen) (Diptera: Agromyzidae) confirmed as a root-miner of common valerian, *Valeriana officinalis—On 8.vii.2001, I took several specimens of a handsome black and yellow agromyzid fly on rough ground at Earlypier (NT2449), Peeblesshire (VC78). These were easily identified as *Napomyza elegans* (Meigen, 1830). Identity was also confirmed from the male genitalia. Spencer (1976, *Fauna Entomologica Scandinavica* **5**, 332) states that the host and early stages of this species is unknown but it is believed that the larva may feed in the roots of common valerian, *Valeriana officinalis* L. (Valerianaceae). As valerian was abundant at the site, a return trip was made on 11 July to collect a few rootstocks of the suspected host-plant. Subsequent examination of these rootstocks revealed that some of the roots contained mines. The mines started near the base of the root and progressed down the root, getting broader as they went (Fig. 1). Two of the mines still contained unemerged puparia in their terminal part. The puparium is spindle-shaped and is 4.5 mm long with a diameter of 1.3 mm. It is pale straw-coloured with the posterior spiracular complex consisting of two well-separated prominences each with a slightly raised ridge containing a double row of 5 or 6 spiracles (Fig. 2). A single male *Napomyza elegans* emerged from one of these puparia on 19.vii.2001, thus confirming the causative agent of the root-mines. The other puparia became too dry and failed to emerge.—K. P. Bland, National Museums of Scotland, Chambers Street, Edinburgh, EH1 1JF.

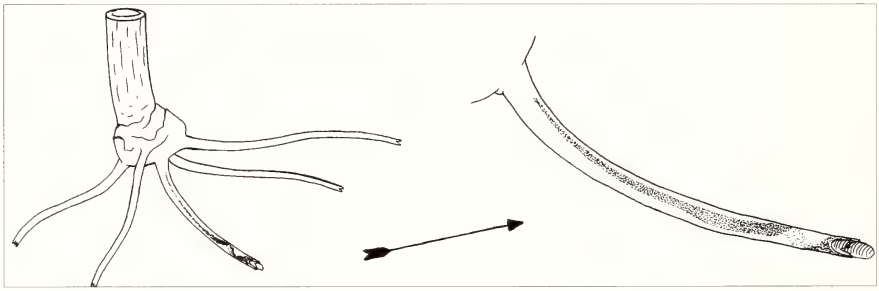

Fig. 1. Sketch of the position and form of the mine of *Napomyza elegans* in the roots of common valerian.

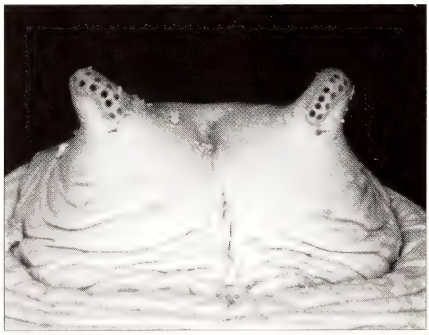

Fig. 2. Scanning electron-microscopic enlargement of the spiracular complex on the posterior end of the puparium of *N. elegans*.

AN APPRAISAL OF THE STATUS AND ECOLOGY OF *GYMNOSOMA NITENS* MEIGEN (DIPTERA: TACHINIDAE) IN BRITAIN AND ITS RELATIONSHIP WITH THE FAUNA OF THE THAMES TERRACE GRASSLANDS OF THE EAST THAMES CORRIDOR

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Abstract. Previously unpublished records of the tachinid fly *Gymnosoma nitens* are detailed and its status and ecology in Britain are discussed in relationship to the fauna of the East Thames Corridor.

INTRODUCTION

Nationally important invertebrate assemblages have been identified in the East Thames Corridor in recent years (e.g. Harvey, 1994; Tattersfield *et al.*, 1996) and there is increasingly recognition of the importance of this invertebrate fauna (Benton 2000; Harvey, 1999; Plant & Harvey, 1997) at a time when there is enormous development threat to most of the sites and habitat mosaic. The short communication by Richard Jones (1999) on recent records of *Gymnosoma nitens* refers to the capture of the fly at Essex sites of the north bank of the Thames. The number of new *Gymnosoma nitens* records in south Essex and north Kent and an association with the East Thames Corridor fauna suggest a full examination of the British distribution is worthwhile.

The first British record of *G. nitens* from Happy Valley near Box Hill, Surrey is given in Clark (1958) and Belshaw (1993). The second, third and fourth published records are described in Plant & Smith (1996). The paper attributes a capture by C. W. Plant on 2.vii.1995 at Richborough Power Station, East Kent as the second British record but details of two more specimens collected at Mill Wood Pit, South Essex have the year of capture transported from 1994 to 1995. The correct details, previously given in Smith (1995), are of one female collected by the present author on 1.viii.1994, with a second female collected by C. W. Plant on 3.viii.1994. Earlier captures at White Downs, Surrey in 1977 (Jones, 1999) and of large numbers at Lydden Hill, East Kent in 1985 (Clemons, 1999a) have subsequently been published.

L. Clemons has also taken the fly in West Kent at Trosley Country Park (TQ6461) on 20.vii.1996 (op cit.) and at Darenth Park (TQ569724) on 26.vii.1998 (Clemons, 1999b). Jones (1999) records a male taken at Woodlands Farm near Bexley (TQ446765). In Essex J. W. Ismay (*pers. comm.*) has collected the fly adjacent to the railway embankment at Chafford Hundred (TQ589785) on the edge of the now destroyed Mill Wood Pit site in July 1996, May 1997, on 22.v.1998 and present but not collected on 18.v.1999. He has also collected one adjacent to Grays Chalk Pit SSSI in another part of the Chafford Hundred area at TQ606793 on 22.vi.1998. C. W. Plant has taken a single male at West Thurrock pulverized fly ash (PFA) lagoons (TQ5876) on 2.ix.1996 (Plant & Harvey 1997), R. G. Payne (*pers. comm.*) has collected one female at Southend Sewage Works (TQ879875) on 4.vi.1997. The present author has also collected *G. nitens* at Southend Sewage Works (TQ879874, South Essex) between 14.v and 17.vi.1998 and at six more sites in the East Thames Corridor: at St Clements Church tract in West Thurrock (TQ592771, South Essex) on 30.iv.1997; at Thamesmead (TQ4681, West Kent) on 19.v.1998; Creekmouth

(TQ455818, South Essex) and the nearby Barking PFA lagoons (TQ4682, South Essex) on 24.vi.1998; near Darenth Wood (TQ5672, West Kent) on 17.v.1999; Northwick, Canvey (TQ7683, South Essex) on 23.viii.1999, 21.vi.2000, 23.vi.2000, 17.vii.2000 and 14.ix.2000. P. J. Hodge (*pers. comm.*) collected the species at Littlebrook Lakes, Dartford (TQ555761) in West Kent on 21.vii.2000 and G. A. Collins (*pers. comm.*) has collected it in Surrey at Howell Hill, Ewell (TQ239619) on 28.vii.1999 and at Box Hill, Dorking (TQ176521) on 12.v.2000. The distribution map in Fig. 1 summarises the known British data.

Status and ecology

The hosts of the fly in Europe are the pentatomid bug *Sciocoris cursitans* (F.) and the non-British *S. helferi* (Fieber) (Belshaw 1993) although Clark (1958) cites further hosts and Jones (1999) found the closely related *Podops inuncta* (F.) but not *Sciocoris* at the Bexley site. In Britain the Nationally Scarce *Sciocoris cursitans* overwinters as an adult, lays its eggs in the spring, and develops fairly quickly. Since the adults are long-lived, they can be found in any month of the year, but are at their lowest ebb in July, when the adults of the previous year have mostly died off and the next generation has not yet matured (P. Kirby *pers. comm.*). Southwood & Leston (1959) state that *Sciocoris* oviposits in May–June and adults start to mature from early August onwards. The onset of egg-laying probably depends on spring temperatures, and there is variation in the maturing times in the autumn; last-instar nymphs have certainly been seen in mid-September (P. Kirby *pers. comm.*).

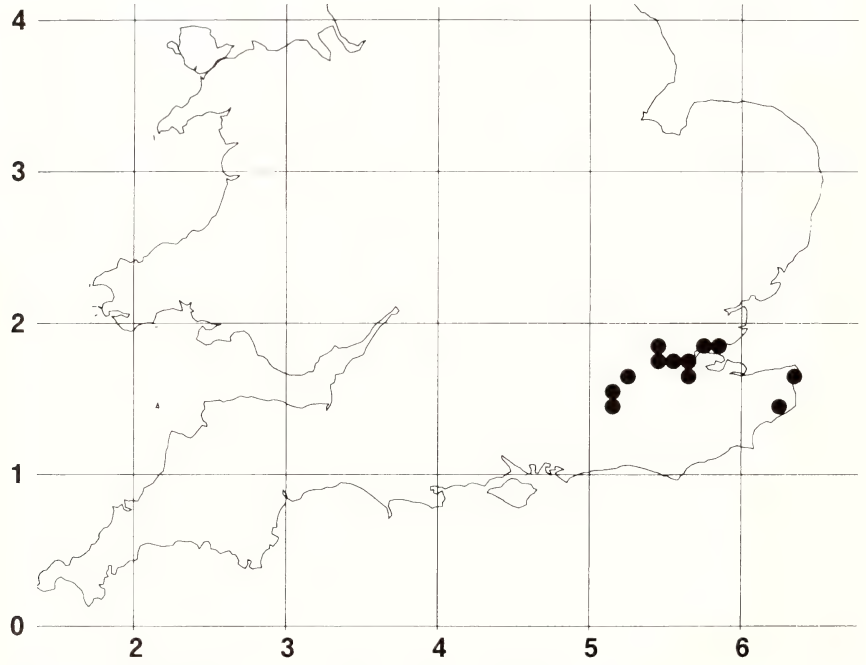

Figure 1. 10 km distribution of *Gymnosoma nitens* in Britain

S. cursitans is especially, but not exclusively, associated with chalk grassland and calcareous sand, and is always found on unshaded, well-drained and friable soils with a rather open vegetation structure and usually with a component of bare ground. Though believed to be phytophagous, there appear to be no certainly identified food plants, and it may be polyphagous.

S. cursitans appears to have two centres of distribution in Britain, in the south-east and the south-west. It is most frequent in Kent, on dunes, downs, and other well-drained soils. In Essex it is known only from the Thames corridor. It is also found on the downs of Surrey and there is a recent record from Thursley NNR (J. Denton, *pers. comm.*). There are a number of records from the dunes and cliffs of Cornwall, but there are otherwise only scattered records from the south-west, extending to Somerset and Hampshire.

A number of localities for *G. nitens* are on chalk. Box Hill and White Downs are both unimproved chalk grassland sites: Lydden Hill is a chalk cutting and Trosley Country Park is in a predominantly calcareous region (Clemons, 1999a); the Darenth Park site consists largely of chalk and flint (Clemons, 1999b); the specimen from near Darenth Wood was swept in rough chalk grassland; at Mill Wood Pit the first two specimens were collected from grassland by the side of a west-facing bank adjacent to an area of sparsely vegetated chalk with developing birch and sallow scrub. Later specimens were collected on a bank adjacent to a railway embankment which consists of short heavily rabbit-grazed grass with some hawthorn scrub (J. W. Ismay, *pers. comm.*). The calcareous nature of the substrate is also evident at most other sites. The specimen from Richborough Power Station was swept from calcareous waste ground contaminated with ash and other material from the power station (Plant & Smith, 1996). At Barking and West Thurrock PFA lagoons the substrate is pulverised fly ash (PFA) over former grazing marsh. As the lagoons have dried out they have developed a flower-rich grassland with many calcicole plants. At Canvey the flies were swept from sparsely vegetated drought-stressed flower-rich grassland, which has developed on a layer of silt covering former grazing marsh. The presence of Southern Marsh Orchid *Dactylorhiza praetermissa* in damper parts of the site together with Bee Orchid *Ophrys apifera* and Pyramidal Orchid *Anacamptis pyramidalis* suggests its calcareous nature. At Creekmouth the specimen was swept from a small area of flower-rich grassland close to the river. This was the worksite for the flood barrier and sea defences construction in the 1970s and early 1980s, and chalk and chalky soil was brought in to landscape the new ground (Curson *et al.*, 1992).

However, at Southend Sewage Works the habitat consists of a south-facing sandy bank and at Thamesmead the specimen was collected from an area of grassland and sparsely vegetated clay with lichen. It is likely that a well-drained warm substrate with sparse open vegetation and much bare ground is just as significant. The single most important habitat feature common to all the East Thames Corridor sites where the author has found *G. nitens* is the presence of unmanaged flower-rich grassland with sparsely vegetated areas developed over many years on the poor substrate. The very dry climate of the region, especially in south Essex and the frequent summer drought curtails the development of extensive scrub and maintains the open areas favoured by warmth loving invertebrates like *Sciocoris cursitans*.

The host bug has been recorded at a number of the *G. nitens* sites and is may well be present at the others. In Surrey *Sciocoris* is recorded from open unimproved chalk downland such as Happy Valley and White Downs where J. Denton has found it common (*pers. comm.*). G. A. Collins (*pers. comm.*) has found *Sciocoris* at several sites on the North Downs, including Box Hill, R. G. Payne (*pers. comm.*) collected

several adults on bare sandy slopes at the Southend Sewage Works site on 27 ix 1996 and 4 vi 1997. The author swept *Sciocoris* with *G. nitens* at St Clements Church tract and has collected it on several occasions at the Canvey site in exactly the same area the *G. nitens* has occurred. On 21.vi.2000, two *Sciocoris* were found here, with one and two eggs, quite possibly of *G. nitens*, attached to their underside exactly as described in Belshaw (1993). In 1985 the author collected *Sciocoris* at Grays Chalk Quarry near the site of J. W. Ismay's collection of *G. nitens* on 22.vi.1998. The author has not attempted to search for the host at the other sites where the fly was collected, although he has recorded *Sciocoris* at several more south Essex locations in 2000.

On a number of occasions *G nitens* has been found in some numbers. Clemons (1999a) encountered the fly in large numbers at Lydden Hill, retaining ten specimens. J. W. Ismay (*pers. comm.*) collected six specimens at the old Mill Wood Pit site in May 1997 and in numbers on 22.vi.1998. On 30.iv.1997 the author swept and collected five males and one female at St Clements Church tract, and further individuals were seen but not retained. A total of one male and seven females were collected between 14.v and 17.vi.1998 in pan traps set on a south-facing sandy bank at Southend Sewage Works (including one male and three females determined by D. A. Smith). At least half a dozen individuals were swept in one small area at Northwick, Canvey on 23.viii.1999 and one male and three females were retained. A male and female were collected at the same site at the late date of 14.ix.2000.

Despite this the fly may have a very localised distribution at a site. At Mill Wood Pit both 1994 specimens were collected on two separate days within yards of each other and the further records by J. W. Ismay have been in the same area despite fieldwork in other parts of the site. At St Clements Church tract all the specimens were swept in one small area of sparsely vegetated ground behind the sea wall. On each occasion at Northwick Canvey all individuals have been swept from one small piece of sparsely vegetated grassland with foliose lichen except a single male collected from carrot flowers nearby. The host bug is often abundant where found but colonies may be of rather limited extent (Kirby, 1992). It would be interesting to find out if the localised presence of *G. nitens* is related to a localised distribution of its host in a locality or to some aspect of behaviour—mating in tachinids often takes place at specific sites where the males assemble; males of many species rest in sunlight on foliage waiting to chase passing females and male swarming behaviour has been observed in several species (Belshaw, 1993).

The unincubated egg is laid on the ventral surface of the (usually adult) host's abdomen and the fly overwinters as a larva within the host. Development times in the Tachinidae vary considerably between species and with temperature, but excluding overwintering the larval and pupal stages both last for 1 to 3 weeks (Belshaw, 1993). Herting (1960) in Belshaw gives the flight period of *G. nitens* in Europe as 2 generations per year—the end of May/June and July to September. The range of dates for British records, between 30 April and 14 September, is interesting and the data now available together with the presence of males in early summer and autumn provide convincing evidence for more than one generation per year in Britain, at least in the climatically favourable East Thames Corridor. P. Kirby has made the suggestion that there may be a series of overlapping generations through the summer, with a low point in the adult population when the adult host bug populations are low in mid-summer. The range of dates over which *G. nitens* adults of both sexes have been captured strongly supports this hypothesis. One of the implications of this would be the vulnerability of *G. nitens* to low population levels of

the host, the critical period being the low point of the adult host. Available numerical data for *G. nitens* are summarised in Fig. 2.

Since the fly overwinters as a larva within the host bug Jones (1999) suggests mild winters ought to occasion low mortality. In wet winters flooding and fungi cause great mortality to hibernating forms of the Pentatomidae (Southwood & Leston, 1959) and the combination of mild winters and very low rainfall probably explain why the East Thames Corridor is the centre for so many records of the fly. However it would be unwise to assume the species has increased recently. There has been relatively little comprehensive survey of invertebrates in the region until the last few years, and the national importance of the invertebrate fauna associated with the special combination of climatic and ecological conditions present in the region has only recently been recognised.

The region has a unique climate in Britain, more continental than the rest of the country. In summer, southern Essex is one of the warmest parts of the country, warmer than Kent, further to the south (Jermyn, 1974). Southeast Essex is the driest part of the country with frequent soil water deficit in the months of May through to August, and in winter the Thames ensures mild temperatures close to the river. The climate is a key factor in the importance of the region. The very low rainfall and the frequent summer drought curtail the development of extensive scrub on poor substrates and maintain over long periods the open areas favoured by warmth loving-invertebrates.

There are also many sites with an extensive mosaic of habitats favouring thermophilic invertebrates at the edge of their range in southern England. The region is now known to have an astonishingly rich invertebrate biodiversity associated with the Thames Terrace sands and gravels which has been acknowledged by English Nature to be of national significance for aculeate Hymenoptera and some Diptera. 74% of the national aculeate fauna has been recorded in the East Thames Corridor, with 96% of the Essex fauna recorded on the Essex side since 1993.

It is unlikely that this biodiversity and the extensive metapopulations of many RDB and Nationally Scarce invertebrate species are a new feature of the region.

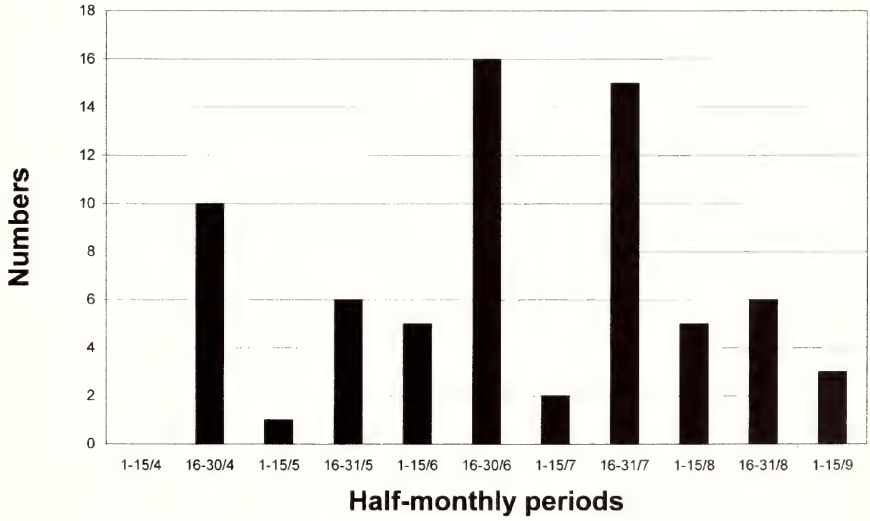

Figure 2. Numbers of *Gymnosoma nitens* plotted against date periods

Indeed there is evidence from work done in north Kent by workers in the past such as H. Elgar, G. E. Frisby and G. Dicker that an important fauna has always been present. Recent longer warmer dry summers may have encouraged an increase in population size and favoured range expansion, but the overall picture is one of a long-standing biodiversity of remarkable wealth and importance.

Unfortunately this wealth and all the brown-field sites are under development threat. Despite its recognised national importance Mill Wood Pit has been lost to housing development, Barking Levels have already been developed for housing and Barking PFA lagoons are being cleared and developed. Thamesmead is an extensive area of habitat with an extremely important invertebrate fauna but it is nearly all lost to retail and associated housing development. Planning permission has been granted for half of the small St Clements Church tract, and the management recommended by ecological consultants on what remains would destroy most of the invertebrate interest. A large part of the Canvey site has outline planning permission for retail development, the site near Darenth Wood is subject to plans for development and none of the (few) remaining sites can be considered safe. Other wildlife areas in the region including nature reserves and country parks are managed more for their flora or for amenity purposes than for their invertebrates. Tree planting is a feature that has become especially prevalent after the gales of 1987 and 1990 but this usually seems to be undertaken without an expert ecological assessment of the existing habitat and will destroy the importance of many invertebrate communities within a few years. There can be little optimism at present for the future of the remarkable biodiversity of the East Thames Corridor.

The status of *Gymnosoma nitens* in Britain is currently Nationally Endangered, RDB1 (Shirt, 1987; Falk, 1991), but evidence now suggests this should be revised. Although it could be argued that a reduction in status to RDB3 or even Nationally Scarce is warranted, the majority of known sites are under immense development threat and Vulnerable (RDB2) would seem to be a more realistic appraisal of the situation.

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References

Belshaw, R. 1993. Tachinid flies (Diptera: Tachinidae). *Handbooks for the Identification of British Insects* **10(4a(i))**.

Benton, E. 2000. *The Bumblebees of Essex*. Lopinga Books Saffron Walden.

Clark, D. J. 1958. *Gymnosoma (Stylogymnomyia) nitens* Meig, (Diptera, Tachniidae) new to Britain. *Entomologist* **91**: 100.

Clemons, L. 1999a. The Phasiinae (Dip.: Tachinidae) of Kent with a confirmed host for *Hemyda vittata* (Meigen, 1824). *Entomologist's Record and Journal of Variation* **111**: 27–35, 197–198.

Clemons, L. 1999b. The Phasiinae (Dip.: Tachinidae) of Kent corrigenda and addenda. *Entomologist's Record and Journal of Variation* **111**: 197–198.

Curson, D., Britton, R. & Game, M. 1992. Nature Conservation in Barking and Dagenham. Ecology Handbook 20. London Ecology Unit.
Falk, S. 1991. *A review of the scarce and threatened flies of Great Britain (part1)*. Research & Survey in Nature Conservation, number **39**. NCC.
Harvey, P. R. 1994. A report on Mill Wood (Gibbs) Pit (Thurrock) and some remarkable new records. *Essex Field Club Newsletter* **11**: 2–6.
Harvey, P. R., 1998. Aculeate Hymenoptera in the East Thames Corridor: provisional distribution maps 1998 update. Unpublished report. Grays.
Harvey, P. R., 1999. South Essex and the East Thames Corridor, *in* Recorder Report for ants, bees and wasps (aculeate Hymenoptera). *Essex Naturalist* (New series) **16**: 41–45.
Jermyn, S. T. 1974. *Flora of Essex*. Essex Naturalists Trust Colchester.
Jones, R. A. 1999. Recent British records of *Gymnosoma nitens* Meigen (Diptera: Tachinidae) and some comments on its status in Britain. *British Journal of Entomology and Natural History* **12**: 140–141.
Kirby, P. 1992. *A review of the scarce and threatened Hemiptera of Great Britain*. UK Nature Series No. 2. JNCC.
Plant, C. W & Harvey, P. 1997. Biodiversity Action Plan. Invertebrates of the South Essex Thames Terrace Gravels—Phase 1: Characterisation of the existing resource. Unpublished report number BS/055/96 for English Nature, Colchester.
Plant, C. W. & Smith, D. A. 1996. *Gymnosoma nitens* (Tachinidae, Phasiinae): second, third and fourth British records. *Dipterists Digest* **3**: 47–48.
Shirt, D. B. 1987. *British Red Data Books: 2. Insects*. NCC.
Smith, D. A. 1995. A very rare Tachinid fly at Mill Wood Pit. *Essex Field Club Newsletter* (March 1995) **13**:14. ISSN 1466-562X.
Southwood, T. R. E. & Leston, D. 1959. *Land and water bugs of the British Isles*. Warne.
Tattersfield, P., O'Toole, C. & Ismay, J. 1996. A survey of aculeate Hymenoptera (bees, wasps and ants) and Diptera (true flies) and recommendations for their conservation. Penny Anderson Associates.

SOCIETY NEWS

Collections of T. R. Eagles and E. A. Bowles

In 1971 the Society received the collection of a prominent member, Thomas Rosse Eagles, following his death. This comprised British Lepidoptera and some other orders. Together with this came the collection of his friend E. A. Bowles who had died in 1954. According to the Curator's Report for 1971 (*Proc. Brit. Ent. Nat. Hist. Soc.* **5**: 43) the Bowles collection contained many aberrations of British butterflies and was also rich in Sphingidae and Sesiidae.

There are relatively few specimens bearing these collectors' names in the Society's collections today and most of those found are in the duplicate collection from which specimens are available to members. It is considered likely that most specimens from these collections have been distributed to members in this way as stated for the Eagles collections have been distributed to members in this way as stated for the Eagles collection in the Curator's Report for 1973 (*Proc. Brit. Ent. Nat. Hist. Soc.* **7**: 55).

A friend of Mr Eagles has expressed concern about the apparent loss of these collections. I would therefore be grateful if any member who possesses specimens from either collection or knows of their whereabouts could inform me as soon as possible so that confirmation can be given that they exist.

The specimens we have bear labels printed "T. R. Eagles" with hand-written locality details (mostly from the London area) or printed "E. A. Bowles New Forest" without further data.

PETER CHANDLER

BENHS INDOOR MEETINGS

13 February 2001

Mr R. A. JONES showed the brown form of *Palomena prasina* (L.), the green shield bug. Before it hibernates, this species changes colour, becoming a dark purplish bronze, thought possibly to be due to decreased metabolism. By the time it normally emerges in May it has reverted to its normal bright apple-green colour. The specimen had come from his back garden that bright sunny afternoon (13 February) and was sunning itself on the fence. Whatever the physiological reasons for its colour change, it also had the result of camouflaging it against the wood. In the wild, tree trunks would seem to be the natural place for insects to sun themselves early in the year, catching the slanting rays of the sun to best advantage. The dark colour would be much less obvious on a trunk while nowhere yet were there any green leaves on which to settle.

Mr R. A. JONES reported seeing an adult red admiral butterfly, *Vanessa atalanta* (L.), at Deptford on 24.i.2001.

Mr A. E. STUBBS said that the syrphid species previously known as *Microdon eggeri* Mik had been split into two species. There had been a possibility that both species would occur in Great Britain. *M. eggeri* had had a disjunct distribution in Great Britain, being found in central Scotland and on the southern English heathlands. It was now possible to confirm that only one of the new species, *M. analis*, was present in Great Britain.

Dr Jeremy THOMAS spoke on the subject of "How to infiltrate ants' nests: strategies used by social parasites". Up to 100,000 insect species interact with ants during their young stages. Most are mutualists or commensuls, but about 5% of myrmecophiles have evolved a much more intimate and one-sided relationship, in which they infiltrate ant societies and exploit the resources of the colony. The talk concentrated on the adaptations that allow two species of *Maculinea* butterfly, ichneumonid parasitoids of *Maculinea*, and *Microdon* hoverflies to inhabit ants' nests. It is well known that the larvae of *Maculinea* butterflies fall off their foodplants when very small and are picked up and taken back to ants' nests. The processes that enable the larva to be taken back to the nest are relatively indiscriminate, but to survive and feed in the nest requires a more precise match to the host. Each species of *Maculinea* has evolved with a specific ant species and the larvae behave differently in the nests. *Maculinea arion* L. is a pure predator of ant broods. It moves very slowly and its lifestyle enables it to avoid adult ants. *M. rebeli* Hirschke, on the other hand, is fed regurgitated food by the ants and out-competes the ant larvae for this food. It can, therefore, be described as a "cuckoo" species. The predation by *M. arion* usually destroys the ant colony and results in an inefficient relationship with ants. The "cuckoo" behaviour of *M. rebeli* weakens but does not destroy the colony and has the added advantage that should danger threaten, the butterfly larvae are carried away by the ants. The parasitoids of *Maculinea* also adopt different strategies to enable them to develop within their hosts in the ants' nests. Species of *Neotypus* wasp parasitise *M. arion* larvae by laying eggs on the larvae when they are still above ground. The species of *Ichneumon* which parasitises *M. rebeli* waits until the *M. rebeli* larvae are in the ants' nests before parasitising them. The wasps can detect the larvae from above ground and enter the ants' nests in search of them. To get in, the wasps squirt chemicals at the ants which causes panic and fighting in the colony and allows the wasp to enter the nest amongst the confusion. Hoverflies of the genus *Microdon*

lay their eggs into, or at the edge of, ants' nests. There may be two cryptic species, one associated with *Formica* ants and the other with *Myrmica*. The *Microdon* larvae are predatory at some, but not necessarily at all, of their stages and may spend two years in the nest. The larvae have secretory structures which may produce chemical cues that enable the ants to recognise them. It is possible that *Microdon* is very specific to the nests in which it was reared as there is evidence that its survival decreases the further away the nest of origin is from the nest it is put in. The strategies adopted by these various myrmecophiles have different ecological costs and benefits, which in turn affect the size and stability of the interacting populations. Many are endangered species which require active conservation measures if they are to survive. The recent re-establishment of *M. arion* at several British sites demonstrates how conservation is likely to succeed only once the complex relationships between ant and myrmecophile are understood.

13 March 2001

The President Mr E. G. PHILP announced the death of Mr G. Botwright, a Special Life Member, and of Col. A. M. Emmet, an Honorary Member.

Mr M. J. BLECKWEN exhibited a pupa of the poplar hawk-moth (*Laothoe populi* (L.)) which had metamorphosed from a larva found on the pavement in Bernard Street, London WC1, almost opposite Russell Square Underground station. He described this as a common insect found in unusual circumstances.

Mr R. A. JONES showed a specimen of *Liocyrtusa minuta* (Ahrens) (Coleoptera: Leiodidae), caught flying in a suburban garden at Bromley (TQ414682), Kent on 11.viii.1990. Although this nationally scarce (notable) beetle is widely recorded, it is very local. Since 1969, it appears to have been recorded from only a handful of sites. This is apparently the first record for south-east England.

The following new members had been elected: Mrs J. Andrews, Mr P. Boardman, Mr W. J. Clarke, Dr I. Duncan, Mr J. D. Ellis, Mrs M. A. Finch, Mr J. Humphreys, Mr T. C. Ings, Mr P. A. Lees, Mr C. M. Manley and Mr I. Woiwod.

Mr D. STIMPSON announced that he had just returned from Andorra la Vella where the legal document setting up the Patrick Roche Foundation for the study of the fauna and flora of Andorra had been finalised and signed. Dr Roche, who died a few years ago, had been a member of the Society and, following retirement, had resided in Andorra. It was Dr Roche's wish that a foundation be set up which allowed for the formation of a collection of Andorran fauna and flora and for the provision of grants for the study of the principality's wildlife. He had left a legacy which had enabled this to be done.

This concluded the Ordinary Meeting which was followed by the Annual Meeting; the minutes of that Meeting will be read at the Annual Meeting in 2002.

10 April 2001

Mr R. A. JONES showed two common insects, collected under unusual circumstances. The first was an example of *Chthonius ischnocheles* Lat. (Pseudoscorpiones: Chthoniidae). This widespread false scorpion has been recorded from beneath stones, logs, in soil and amongst leaf litter and occasionally also in bird and animal nests. This specimen was found on 18.x.1999 on a railway trackside at Sudbury Town, TQ166852, between the pages of a passport, discovered with other important documents presumed to have been dumped over the perimeter fence following a burglary. The animal was only noticed when the passport and other

paperwork was handed in to a London Underground station manager, who spotted the 'bug' and who was more than a little bemused when it was scooped up from under her nose and tubed.

Mr Jones also showed a specimen of *Pseudacteon formicarum* (Verrall) (Diptera: Phoridae). This minute fly is a parasitoid of adult ants, particularly *Lasius* spp., and is widespread in southern England. It was caught as it attacked a trail of *Lasius niger* (L.) moving to and from its nest on the chalk downs at Saltbox Hill, Biggin Hill, West Kent, TQ403604, on 25.v.1999. The fly bobbed up and down a few centimetres above the ants, occasionally swooping down to touch one, and is presumed to have been laying eggs at each ant-contact. Ordinarily, such behaviour would be easy to overlook, but on this occasion, the exhibitor was waiting for a tow-truck to pull his car out of a ditch. There were no other living things to watch as he sat dejectedly on a pile of road-chippings.

Mr R. D. HAWKINS showed the shield bug, *Palomena prasina* (L.), still alive, that had been shown at the 13.ii.2001 meeting by Mr R. A. Jones. At that time the bug was in its winter brown form but had since developed the green colour typical of the summer period. He also showed a specimen of the carabid beetle *Bembidion quinquestriatum* Gyll. found under the bark of a eucalyptus tree in a garden at Horley, Surrey (TQ291419) on 28.vi.2000. It is said to be a rare synanthropic species but it is perhaps more likely that its habitat is under-recorded. Also shown was a specimen of a tortoise beetle, *Cassida sanguinosa* Suff. (Col.: Chrysomelidae), which had been determined by M. L. Cox after an original misidentification. It had been found on a mayweed (*Tripleurospermum* or *Matricaria*) beside a farm track on chalk downs at Amberley, W. Sussex on 27.vii.1986. At that time it was only known from Ireland within the British Isles but has since been found in N. Devon by D. J. Mann (*Brit. J. Ent. Nat. Hist.* **10**: 174).

Mr A. J. HALSTEAD showed a live female *Myopa buccata* (L.) (Diptera: Conopidae). This spring-emerging fly was, like the exhibitor, sheltering from the rain in a polythene tunnel at RHS Garden, Wisley, Surrey. Conopid flies are parasitoids of adult aculeate Hymenoptera and it is believed that *M. buccata* lays its eggs in one of the spring-time solitary bees.

Mr S. R. MILES displayed some conservation booklets he had recently received. These were a Royal Society report on "The Future of SSSIs" and a report by the UK Biodiversity Group, "Sustaining the Variety of Life", which reviews five years' work on Biodiversity Action Plans.

Mr R. A. JONES said he had seen his first comma butterfly on 8.iv.2001. Mr S. R. Miles also reported seeing comma and brimstone butterflies and the bee *Anthophora plumipes* (Pall.). Mr D. Saunders had seen a female painted lady butterfly in pristine condition on 17.ii.2001 at Shanklin, I.o.W.

Mr N. GREATOREX-DAVIES spoke on the UK Butterfly Monitoring Scheme, of which he is the Scheme Coordinator. The Scheme was set up in 1976 and currently has 130 active recording sites. These consist of a fixed transect, usually of 1–3 km, which is divided into habitat sections. The transect is walked at weekly intervals from April to the end of September, although some are now being walked from March to October. The species and numbers of butterflies seen within 5 metres of the observer are recorded for each habitat section. Site indices are collated and weekly averages are used to produce an all-sites index.

The scheme began with 36 sites and some sites now have 20 or more years of data. Most sites are on nature reserves or similar areas, rather than the general countryside. The data produced by the Scheme can be used to show various aspects of butterfly biology. These include: 1. Overall fluctuations and trends in numbers.

2. Changes in numbers at individual sites, which may be related to habitat or management changes. 3. Weather and environmental effects. 4. Range expansion. 5. Colonisation and local extinctions. 6. Migration. 7. Phenology. 8. Within-site distributions. 9. Aspects of population ecology.

Some butterflies, such as the speckled wood and comma, have become more abundant and widespread since the 1970s; the dingy skipper and small heath have declined, while the orange tip and small white have stable populations. Other butterflies, such as the holly blue and painted lady, have populations that fluctuate. Overall, the survey indicates that there are more butterfly species that are stable or increasing than are declining. Some butterflies, such as purple emperor and black hairstreak, are likely to be under-recorded by transect walks as these species spend most of their time high up in tree canopies. For some butterflies, more accurate estimates of numbers may be achieved by searching for larvae or eggs.

The transect walks are being used to provide phenological data, such as the date of first sighting, peak activity and the length of the flight period. Data from the Scheme show that 15 out of 34 butterfly species are now emerging earlier than in the 1970s, and 18 have a longer flight period. The comma is now emerging about two weeks earlier than in 1976. If the climate continues to get warmer this trend will increase and some species may produce additional broods. The speckled wood, comma and brown argus have increased their range further north, while the wall brown, small heath and grayling are now less widespread.

15 May 2001

The President, Mr R. A. Jones announced the deaths of Ernest Barnett and of Special Life Members Laurie Christie and Robert Craske.

Mr R. A. Jones showed a live specimen of *Legnotus limbosus* (Geoff.) (Hemiptera: Cydnidae), picked up that morning by one of the pupils in the playground of Ivydale School, Nunhead, London SE15, shortly before the class went on a "bug hunt". This small bedstraw-feeding shieldbug is not rare, but its secretive habits probably leave it under-recorded. In the provisional maps for the forthcoming Surrey Atlas of shieldbugs, by Roger Hawkins, there are only 14 tetrad records. This is apparently the first recorded for the urban north-eastern-most 10-kilometre square of the survey.

Mr R. D. Hawkins showed a female *Chetostoma curvinerve* Rondani (Diptera: Tephritidae) found on privet beside an ivy in a suburban road at Horley, Surrey on 11.iv.2001. The host plant of this infrequently seen fly is unknown.

Mr A. J. Halstead showed two live anthribid weevils, *Platystomos albinus* (L.) and *Platyrhinus resinosus* (Scop.), both of which are Notable B species. The former was found by Roger Hawkins on the back of Liz Douglas on 5.v.2001. They were attending the BENHS field meeting on Wisley Common, Surrey, led by the exhibitor. The origin of the other species is uncertain as it was found at the Malvern Spring Flower Show held at the Three Counties Show Ground, near Great Malvern, Worcs. but was on the stand of a nurseryman whose plants came from Pickering, N. Yorks. *Platystomos albinus* develops in the dead wood of various deciduous trees and shrubs; *Platyrhinus resinosus* develops in the fungus *Daldinia concentrica* which is usually found on ash. Mr Halstead also showed a live specimen of the curculionid weevil *Liophloeus tessulatus* (Müller) found in his garden at Knaphill, Surrey. It is associated with ivy and the adults eat the foliage.

The following new members had been elected: Ms H. Barlow, Miss C. E. Bloomer, Mr P. R. Brash, Mr N. Clark, Mr P. Clarkson, Mr C. M. Everett, Mr J. Flanagan, Mr M. R. Lawn, Mrs S. Parker, Dr W. Schaefer.

Dr R. J. KEMP, commenting on the lecture reported in the Minutes of 10 April meeting, said he thought butterflies in the last few years had emerged later than usual.

The wildlife photographer RICHARD REVELS gave a talk on "An evening of wildlife photography". He showed photographs of a wide range of moths, butterflies, birds, mammals, wildflowers, toadstools, habitats and landscapes. He explained some of the techniques involved in composing and achieving top-quality pictures, even during a rain-swept week spent in Ireland. Mr Revels has recently produced a book, *Wild Bedfordshire*, habitat and wildlife pictures which will provide an historic record of the county's wildlife at the turn of the century.

12 June 2001

Mr R. A. JONES showed three uncommon insects from London's Battersea Park. Two specimens of the lesser earwig *Labia minor* (L.) (Dermaptera: Labiidae) were swept on 5.vi.2001, near the large litter heap in which the park's leaf-fall, grass cuttings and other plant material is composted. This earwig is reputed to have been more common in former times, when regular horse transport resulted in large numbers of well-established manure heaps. A single specimen of the very local weevil *Pentarthrum huttoni* Wollaston (Coleoptera: Curculionidae) was found, together with the very similar but very common *Euophryum confine* (Broun), in the rotten heartwood of a large sycamore tree on one of the islands in the ornamental lake on 6.vi.2001, in company with another wood-eating weevil, *Rhyncolus lignarius* (Marsham). A specimen of the nationally scarce (Notable B) beetle *Dasytes plumbeus* (Müller) (Coleoptera: Melyridae) was swept from long grass under plane trees near the Battersea Bridge entrance on 5.vi.2001.

Mr R. D. HAWKINS showed a live specimen of a female *Leptarthrus vitripennis* (Mg.) (Diptera: Asilidae) found 11.vi.2001 at Dollypers Hill, Coulsdon, Surrey. This uncommon robber fly, which was added to the British list by the exhibitor in the mid 1990s, was taken at rest in late evening on the trunk of an ash tree. He also showed a parasitic fly *Cadurciella tritaeniata* (Rondani) (Diptera: Tachinidae) with its host butterfly, the green hairstreak, *Callophrys rubi* (L.). Both had been reared from caterpillars found on broom in the Forêt d'Hardelot, near Boulogne, France on 24.vi.2000. The butterfly emerged and died by 29.iii.2001; the parasite, which has been recorded in Britain, emerged on 21.iv.2001.

Mr A. J. HALSTEAD showed an exotic black ant which was one of several found on the trunks of large date palms, *Phoenix dactylifera*, in a garden at the Chelsea Flower Show in May 2001. The plants had been flown to Britain from the United Arab Emirates.

RICHARD FOX spoke on the butterfly Millennium Atlas project. This project, which has been the largest butterfly survey undertaken in Britain, began in 1995. An earlier survey had been done in the 1970s but this needed to be updated as it was clear that some butterflies had declined while others had expanded their range since that time. About ten thousand recorders were involved in the Millennium project and they submitted around 1.6 million records and made over 462,000 site visits over the five-year recording period. Seventy people acted as co-ordinators and there were 270 local recording groups. Very high coverage of the British Isles was achieved: 99% of Britain's 2785 10 k squares, averaging 18.9 spp/square; the coverage in Ireland was

98.5% of the 995 10 k squares with an average of 9.8 spp/square. The end result of the surveys has been the publication in 2001 of *The Millennium Atlas of Butterflies in Britain and Ireland.*

The butterflies of Britain and Ireland can be broadly divided into habitat specialists or wider countryside species. Some of the former group are in decline due to changes in land use and the increasing fragmentation of the remaining suitable habitat. Wider countryside species are more adaptable and mobile, and so are less affected by these problems. Some butterflies in the latter group have considerably extended their range compared to the 1970s. This is likely to be due to climate changes that have allowed these species to colonise areas that were previously unsuitable. The Millennium project has shown significant declines in the distribution of the high brown fritillary, wood white, pearl-bordered fritillary, marsh fritillary and dingy skipper since the 1970s. The white admiral, Essex skipper and the comma have shown expanded ranges.

The data gathered during the Millennium project are being used to reassess conservation priorities and provide a base-line from which the effects of conservation actions can be measured. Information from the surveys and the *Atlas* can be used to support conservation initiatives during the planning process and the development of local biodiversity action plans. Further research can be carried out into the causes of changes in butterfly abundance and distribution, using the Millennium project data to show an accurate base-line for butterflies during the period 1995–1999. The project has raised the profile of butterflies and their conservation needs, and this could be of benefit to other invertebrates. Future challenges for the conservation of butterflies include encouraging the farming community to maintain traditional grazing practices, to protect brown-field sites where a rich insect fauna has developed, and to encourage a wider landscape approach to conservation instead of concentrating on nature reserves.

The President congratulated Dr Fox and his co-authors on the excellent *Atlas* that had been published earlier this year.

10 July 2001

The Vice-president Mr E. PHILP announced the death of Dr Don Goddard, a coleopterist from Worcestershire.

It was announced that Mr Stuart R Irons and Mr Martin Catt had been elected members.

Mr STEPHEN MILES showed a copy of *An Introduction to the Spiders of South-east Asia* by Frances and John Murphy. This book had been started by Frances before her untimely death in 1995, and it includes many of her photographs. Bravely, her husband John took on the task of finishing it, which culminated in its publication by the Malaysian Nature Society in 2000. The book will be placed in the Library.

Dr Muggleton read out a communication from the President, Richard Jones. In this he reported that on Sunday 14.vi.2001 he was alerted by a pavement blackened with frass pellets beneath several lime trees lining the streets of East Dulwich. The leaves of these trees were almost completely shredded by the caterpillars of the brindled beauty, *Lycia hirtaria*, which were estimated at 2000—5000 per tree. Mr Jones reckoned that it was doubtful, however, that the moth would have a good year

because every caterpillar examined was liberally spotted with the eggs of the many tachinid flies which were actively pestering the larvae.

Dr J. MUGGLETON spoke about melanism in the two-spot ladybird, *Adalia bipunctata* L. This species has many colour forms, some of which have very similar colour patterns to other species. In the Natural History Museum there is a collection from 1696 which includes some melanic forms, indicating that these are not just a modern phenomenon. In this collection the specimens had been preserved by pressing them between the pages of a book! Some of the early students of colour variation in ladybirds were Russian geneticists. One of these, Lusis, worked out the inheritance of the different colour forms of *A. bipunctata*. He also looked at their distribution in Europe and concluded that melanic forms were more frequent in coastal and cloudy areas than elsewhere.

Robert Creed, working in Britain in the 1960s, linked melanism in *A. 2-punctata* to the levels of smoke pollution. He concluded that the frequency of melanics increased with smoke pollution. However, he found two areas (Gloucestershire and to the south-west of London) where the melanic frequency was higher than expeced. Subsequently Brian Benham, John Muggleton & David Lonsdale re-analysed the data and concluded that the melanic frequency was related to sunshine levels rather than to a toxic effect of smoke pollution. Sunshine levels are determined by both smoke pollution and cloud cover. Later sampling studies in the 1970s revealed declines in melanism in the UK. These seem to have followed the considerable reduction in smoke pollution in the UK since the mid-60s.

Over the last four years Dr Muggleton had visited a number of sites where samples had been collected in the 1970s. A few of these sites had experienced considerable alteration, limiting their use for a new survey. However, most were relatively unchanged and it was remarkable that in urban areas the majority of the waste-ground sites sampled in the 1970s had remained undeveloped. In many towns in the north-west of England and in the Midlands there had been a large drop in the frequency of melanics but there was little change in the surrounding rural sites. Dr Muggleton speculated that where the frequency of melanics remained unchanged it was because the determining factor in those places was cloud cover rather than smoke pollution.

In contrast, to the south-west of London and in Gloucestershire there had been an increase in melanic frequency. The melanic frequency in the leafy suburbs of west Surrey was now the same as in central Birmingham or Sheffield. However melanics were rarely found in central London. The speaker had no idea why these increases had occurred. Others had suggested that car exhaust emissions might be a cause of this increase in melanism; the absence of melanics from central London would seem against this.

In conclusion, Dr Muggleton said that the decrease in melanic frequency seen in the 1970s had continued, but that it was now accompanied by increases in melanic frequency in other areas. If this continued one possible outcome could be a more or less uniform frequency of melanics throughout Britain.

11 September 2001
Joint BENHS/LNHS meeting

Mr RAY SOFTLY was in the chair for a joint meeting with the Entomology Section of the London Natural History Society, held in the Haldane Room at University College, London WC1.

Mr R. A. JONES showed a group of shield bug nymphs, *Elasmucha grisea* (L.) (Hemiptera: Acanthosomatidae) on a birch leaf. He also exhibited a live head-louse *Pediculus humanus* L. (Siphunculata: Pediculidae) that he had plucked from his own scalp.

Mr A. J. HALSTEAD showed a gelatinous egg mass which was one of several found on hazel leaves near a pond in Epsom, Surrey. These eggs subsequently hatched and the larvae were identified as those of a caddis fly.

Mr M. BARCLAY showed a live specimen of a weevil, *Otiorhynchus salicicola* Heyden. This is one of several introduced *Otiorhynchus* species that have been found in Britain in recent years. It was first discovered in Victoria, London by Stuart Cole in 2000. The specimen exhibited was found on 10.ix.2001 near the Eurostar rail track at Chelsea Harbour Club by Mr Barclay's stepson.

Miss RUTH DAY, who is the LNHS representative on the London Biodiversity Partnership, drew attention to a proposed Habitat Action Plan for acid grassland in the London area. She urged members of the BENHS to assist the LNHS in raising the profile of invertebrates in this rich habitat. Anyone with data or knowledge of acid grassland in the London area should contact Miss Day.

Mr F. O. SULLIVAN reported that during the LNHS Botany meeting at Mile End Millennium Bridge he had seen a wasp spider, *Argiope bruennichi* (Scop.), on the steps.

Mr R. SOFTLY noted that the spider *Araneus diadematus* Clerck was having a good year and that *A. quadratus* Clerck was plentiful on Hampstead Heath after two relatively poor years.

Miss R. DAY reported that the small red-eyed damselfly, *Erythromma viridulum* (Charpentier), first discovered breeding in Essex in 1999, has now spread to the London area. It is present in Bennet's Park, Havering, near Romford, Essex.

Mr D. ROOUM reported that this year he had seen three species of dragonfly and two damselflies on the Regent's Canal at Mile End. In the previous four years he had seen none.

Mr MAXWELL BARCLAY gave the seventh Brad Ashby Lecture and spoke on Bookham Common: 100 years of beetle recording. Bookham Common, Surrey, occupies the squares TQ1256 and 1255. It is mostly oak woodland and scrub with ten ponds and grassy plains. It is an SSSI and is owned and managed by the National Trust. Most of the woodland on the Common is not particularly old, although there are some venerable oak trees. The Common has been extensively recorded by entomologists for just over 100 years, helped no doubt by its easy access to London naturalists because of the nearby railway station. The London Natural History Society has been recording there on a regular basis for the last 59 years and has a hut on the Common. Recording meetings take place on the second Saturday of each month.

Dr Barclay gave a history of Coleoptera recording on Bookham Common. Many notable coleopterists have visited the Common and added to the records. A particularly active recorder was a local GP, Dr Alan Easton, who added around 2000 beetle records during 1936–1970. Ian Menzies has recorded a similar number in more recent times.

The species list for Bookham now has about 1400 species, with new additions still being made. Some of these are recent colonists to Britain while others are species that have been made detectable by using different recording techniques, such as the use of vacuum equipment. Other techniques for recording include the use of sweeping nets, beating trays, pitfall and bait traps, turning over logs and stones, sifting vegetation and inspecting flowers. Despite the intensive recording that has gone on over the

years, there is one common species that is missing from the list. The tenebrionid beetle *Cylindrinotus laevioctostriatus* (Goeze), which is very common in most other parts of Surrey and elsewhere, appears to be absent from Bookham Common. Three species of beetles have been added to the British list from specimens found on the Common. Dr Barclay showed slides of the various habitats and some of the beetles found on the Common.

CONFERENCE REPORT

Insect Information: From Linnaeus to the Internet. The Entomological Libraries and Information Network (ELIN) conference for entomological librarians, Royal Entomological Society 24–27 October 2000

This was an interesting and thought-provoking meeting, organised jointly by the library staff of the Royal Entomological Society and Natural History Museum. Around 45 delegates attended, mostly librarians, from the University of Chittagong, Bangladesh, INRA France, SUAS Sweden, DEI Germany, NC, CU and Harvard United States, The Canadian Agricultural Library, ICIPE Kenya, Netherlands Natural History Museum, CSIRO Australia, Natural History Museum London and Oxford University Museum.

After a welcome from Professor Mike Claridge, President of the RES, and Bill Blackmore, the RES's registrar, the ELIN conference opened on Wednesday, the theme for that day being "The role of historical library collections in a modern context".

Dick Vane-Wright, (Keeper of Entomology at the Natural History Museum, London) during his talk on entomological libraries and access to scientific information, outlined a brief history of the development of entomological libraries in the United Kingdom. The first entomological libraries were owned by wealthy private individuals who frequently made their contents available to other interested amateur parties for study and research. Stainton was one such altruistic entrepreneur. In 1864 there were around 500 entomological publications appearing each year, and such institutions could cope with this level of acquisitions. By 1976 however, this stood at 12,300 titles. One can only speculate what the total is now! Today there are approximately 130 institutional libraries world-wide, catering in the most for professional entomologists.

Dick defined the role of a librarian today as:

1) Management of acquisitions to build on the strengths of their library, with a mind to its future needs.
2) Organise information by helping users find what they require, avoid unnecessary duplication, arrange interlibrary loans and publicise their institution through media such as presentations.
3) Be an information technology provider by training users in the operation of databases.

Today digital abstracts provide fast access, but currently there are only 12 entomological journals on-line, the information they contain dating from the 1970s.

So such entomological digital information sources are relatively modern in their content. The variable quality of entomological data on "The Web" was highlighted; with 126,000 entomological sites in existence this is not surprising. Care should be exercised when using and quoting from this source. The lack of peer review with web publications was highlighted. Dick concluded by suggesting that one aim for the future, with the enabling technology we have today, should be to digitise historical documents and publications so making them available to all who want or need access to them: the "virtual library" with world-wide access. However, this would incur a cost.

Julie Harvey, the entomological librarian at the Natural History Museum, then addressed the relevance of historical library collections today. Historical library material consists of a) published material, b) manuscripts and drawings and c) ephemera. Although they may be two or three hundred years old, many of the published items are still of relevance to taxonomists today as they constitute original sources. Many drawings, figures and prints are still of taxonomic significance and libraries often hold unique unpublished material of this nature. Many plates have been annotated by their original owners, or others along the way, but unfortunately they are of some commercial value today as interior decorations. Many libraries hold correspondence between entomologists of historical importance on many levels, entomological and social. Manuscripts often contain data applicable to extant specimens in collections, some of these being type material. Ephemera are an unusual grouping, consisting often of sales catalogues, postcards with an entomological theme etc.

There are many problems associated with such historical material. Access can be difficult as many items are unique and only exist in a distant library. Viewing has to be arranged and closely supervised and photocopying is not possible with such fragile items. Enhanced cataloguing, in the form of data extraction and profiling, would improve access but digital images of such items would be the ultimate answer to this problem. However, the accuracy of digitised material has proved problematic, resulting in scholars often requiring access to the original source. Consequently microfilm still has a place today. It is stable, cheap and can be digitised too.

Sandrine Ulenberg of the University of Amsterdam then spoke on the preservation of items in the library of the Netherlands Entomological Society. This was financed from the interest on a benefactor's bequest and cost around £25,000 taking three and a half years to complete. She stressed that preservation of historical material is a very skilled job requiring a high level of expertise and should only be entrusted to professionals. Furthermore, the condition of restored items needs to be continually monitored and certain restoration tasks will need to be repeated periodically.

On a similar theme, Dr Groll of the Deutsches Entomologisches Institut told us about the new Horn and Schenkling library and the work they have undertaken recently to catalogue their accessions on a database. This is now complete and holds around 40,000 items. Internet access is planned.

Later that afternoon the conference adjourned to the National History Museum for a guided tour of the rare books room and entomology department. This was a most interesting and informative visit organised by Julie Harvey.

Thursday's theme was "Entomological information: the current challenges". The day commenced with a trip to the Oxford University Museum of Natural History. On arrival we were welcomed by the museum's director before a guided tour of the Hope Library and museum's entomological collections. During this, many interesting architectural aspects of the building were pointed out. If readers have not visited this institution before I can recommend it. If you get a chance, and he's not too busy, ask George McGavin, Assistant Curator of Entomology, about the tale of the giraffe's tail. Rare books again featured during the visit to the Hope

Library, together with their huge collection of drawings and correspondence. A tour of the document restoration department proved very interesting. A project they were working on at the time, restoration of old maps, was very topical for several present as they were facing similar problems with such items.

Later we were addressed by Stella Brecknell, librarian for the Oxford University Museum's Hope and Arkell Libraries, on the subject of identifying information sources for taxonomic entomologists. The Hope Library is charged with supplying the bibliographic resources to support the curatorial research and teaching needs of the museum's staff and research students. It also serves anyone needing taxonomic entomological material at research level, provided they are *bona fide* scholars. Their information sources include printed publications, the internet and various abstracting services. Future plans include the digitisation of their most-used items and of some rare books. This will inevitably result in the Hope Library becoming a "hybrid library", making much greater use of electronically-stored information which is not available locally.

This lecture was followed by a talk on the use of library resources in entomology dissertations at the University of Manitoba by Julie Harvey who stood in for Karen Clay, assistant librarian at the William R. Newman Library, University of Manitoba. She reported the results of Karen's research on the use of library resources by entomology students. The research was done through a detailed analysis of citations from theses of entomology graduates. The number of references cited had risen from an average of 30 (16% being journals) per student in 1950 to 90 (33% journals) in 1990. Over the same period the number of monographs cited fell from 25% in 1950 to 5% in 1990, while the proportion of government documents cited was unchanged. This shows the importance to entomological libraries of maintaining a good selection of journal titles.

The theme for Friday was "Insect Information: looking to the future". The day commenced with a group exercise whereby delegates were divided into four groups to spend 10 minutes brainstorming a) the positive and b) the negative aspects of technology in the library, c) famous librarians and d) new ways to attract users. Several interesting observations stemmed from this.

After this Berit Pedersen, librarian at the RES, spoke on the human spirit in the age of machines, or why you should fall on your knees and worship the librarian (her title, not mine, although I heartily agree with the sentiment). She addressed the image that the public has of librarians, saying that their chief aim is to provide a service to users, conduct targeted high quality searches, conserve historical material, balance their budget and, increasingly today, digitise old material.

Elaine Boyers, publishing editor of CABI, then addressed the future of the entomological printed word. Peer-reviewed journals are effective at communicating information but today these can be written, edited and published electronically, either on paper or in an electronic format. Paper publications have the advantage that they can be owned, have an aesthetic look and feel to them, and are portable. One can easily browse through them, index and archive them. However, they can only be used by one person at a time, need storage space and the information they contain is slow to transmit. Electronic databases have the advantage of a high degree of cross referencing and they can be accessed by many users simultaneously from various internet servers. However, you often have to pay to use them. A recent development from America is the E-book, a format that lends itself to customisation. E-books are aimed largely at the academic market at present. The old adage "sorry, it's out of print" should never apply to them and short runs will be economic to produce as publication costs will be independent of subscriber numbers. However,

CD-ROMs flopped and E-books may do so yet. "Publication" on the internet is the cheapest option today, but at the loss of the peer-review process.

Nigel Robinson of BIOSIS then spoke on electronic entomological information: bugs in the next millennium. Electronic indexes can hold vast amounts of data and are frequently updated. However, they can be expensive to use. There are several internet search engines that access entomological journals. One called Google (www.google.com) was recommended if you want to find a specific article, as currently it searches the largest number of databases, where Yahoo is fast but accesses fewer sources.

The present situation in developing countries, and prospects for future developments, was described by Professor Amin Badrul of the University of Chittagong. Bangladesh has seven university libraries with entomological holdings, one national museum, eight institutes (one providing free information) and two national libraries with entomological material. Not all of these have links to the telephone system, so accessing the internet from them can be problematic. Consequentially, the relative cost of accessing entomological or any other sort of information sources in developing countries is very high. Few libraries regularly subscribe to foreign journals or have photocopying facilities. The only indigenous entomological publication is the *Bangladesh Journal of Entomology*. Articles in other publications not held by one of the country's libraries have to be ordered from the British Library via a central clearing house, BANSDOC. This process means that it can take three months or more for requests to arrive. Furthermore, there is no national database of insect collections. Consequently nationally important taxonomic research into vectors of disease or agricultural pests can be a slow process. Professor Badrul advocated the establishment of a directory of Bangladesh entomologists and libraries with entomological holdings. He recommended such libraries to take electronic subscriptions to international journals, the development of a centralised communications network, a national database listing library holdings and a national reference collection of insects to help improve this situation. Ultimately, the establishment of a national insect museum would be desirable along with free access to information sources.

Insect collection archives, bioinformatics and improved access to these were the topics of a talk by Malcolm Scoble of the Natural History Museum. In 1785 Linnaeus first proposed the modern binomial system for naming species, but historically most descriptions were published in the century from 1850 to 1950. He gave as an example his recent publication on *Geometrid Moths of the World*, stating that it took a total of around 4.5 man years to complete. But why publish it in a two volume hard-back format rather than electronically? People like books, the authors can provide a thorough index, the publishers can recoup their expenditure and books have a fixed publication date that can be referenced. Development of an alternative format, VIADOCS (versatile internet archive document convention system), was funded recently by the BBSRC/EPSRCs bioinformatics programme. This produced a primary publication in the form of a CD-ROM and catalogue on the internet, but it also contributed to the wealth of digital data now stored on Lepidoptera. ENHSIN (European Natural History Specimen Information Network) is a database of information on specimens held in museums around Europe. This was produced under the 5th Framework directive of the European Union. So far it has cost around 200,000 Euros and is intended for expansion, funded under the 6th Framework directive.

Paul Hillyard, from the information service of the Natural History Museum, addressed the subject of using insect information to satisfy two needs: departmental

income and public access. The museum achieves this through its enquiry and identification service. They handle around 4000 enquiries each year, the majority (over 90%) coming from the general public. These are answered within one week free of charge to UK residents. Consultants using the service are charged £52 per identification, with a premier 24-hour service at double this rate. Such enquiries often come from HM Customs, environmental scientists, public health inspectors, the food industry and legal, medical and forensic services. The number of E-mail enquiries they receive from around the world, 50% of which come from the USA, are doubling each year. This is a healthy situation but many are of questionable quality. So they have decided to make better use of the internet for marketing. Paul reported a perceived lack of departmental internet penetration but at the same time they are conscious of the need for more free information, a constant dilemma for librarians these days it seems.

Last, but not least, Marty Schlaback, the librarian for Cornell University, spoke on taxonomic treasures: collaborating to digitise the rare entomological literature. This was a proposal for collaboration, or rather a call to action, to the world's leading entomological libraries to improve public access to the rare publications. It would be a huge project, centred initially on publications concerned with morphology, taxonomy, expeditions, geographic descriptions, natural history, descriptions of collections and on economic entomology: all predating 1863. The establishment of such a project would overcome problems of security, fragility and distance, creating a digital library. UNRSCO/IFLA are currently providing Cornell with funds for the International Federal Library Associations Directory of Digitised Collections (accessible on the Net). Marty stated that many institutes wish to collaborate with the rare books initiative but development of an overall plan will be needed for this to proceed. Such a plan should include a comprehensive list of items to be digitised (and the criteria for their selection) and demonstrate a systematic approach to avoid duplication. Hardware and software will need to be standardised and a decision made regarding whether to reproduce items in colour or black and white. Marty explained that this is not as obvious as it may sound. The management of such a huge project will have to be of exceptional quality, central to this will be a robust and transparent decision-making process. Sustainability and user assistance will be vital, but of greatest importance for this project will be securing a source of funding.

The conference concluded with a review of the previous three days. The frequent references to digitisation and on-line database facilities highlighted the growing technological innovation taking place in the world's libraries (but not at Dinton Pastures, yet!). During this session it dawned on me that your library appears to be unique in that we positively encourage you to bring your insect specimens into the library area in order to identify them from taxonomic publications. No other libraries represented at this conference enable this, most explicitly excluding this option. This was highlighted by the catch-22 situation, recounted by several delegates, that keys in CD-ROM format owned by libraries are licensed to one computer and, as such, cannot legally be loaned to library users for use on other machines, e.g. at home or at work. Yet users cannot bring specimens in for comparison with these keys. The high level of usability (access) at Dinton Pastures is a strong argument for practising entomologists to join the British Entomological and Natural History Society and take advantage of this unique opportunity.

I would like to thank the conference organisers for a stimulating three days and your Council for sponsoring my attendance at this conference.

IAN SIMS (Honorary Librarian)

OBITUARY

Laurie Christie, 1929–2001

Laurie Christie, who died on 2 May 2001 after a long illness, was best known as a supplier of entomological specimens, equipment and books. Laurie was born on 22 August 1929, in Eastbourne, Sussex. He was interested in nature from a very early age, and when three or four years old was able correctly to identify plants which had been wrongly named by his parents. When he was seven his father became station master at Hackbridge on the edge of Mitcham Common, and his parents moved to South London, where Laurie was to spend the rest of his life.

He learned his entomology the practical way by collecting the butterflies and moths of the Common. He was very much a self-made man, and left school at 14, already with a lifelong interest in living creatures. He informed the Youth Employment Agency that he would only accept a job that involved working with butterflies and moths, which caused some problems, but then went to work at the natural history suppliers Watkins & Doncaster, situated in The Strand. When not working he would spend his evenings and weekends out collecting Lepidoptera. He was duly called up for National Service in the Royal Army Ordnance Corps from 1947–49. On one occasion, when the barracks were inspected by the Commanding Officer, Laurie refused to move his newly-set specimens off his bed. But instead of the expected dressing down, the CO spent a long time chatting to him, as he too was an enthusiastic entomologist. After the army, Laurie returned to Watkins & Doncaster. My own recollection, when I first visited Watkins & Doncaster as a complete novice in the mid 1950s, was of being served by a tall, thin and extremely courteous gentleman, who was genuinely keen to encourage and help a beginner such as myself.

Laurie was always happiest being his own boss, and left Watkins & Doncaster when their building was demolished for widening of The Strand. He set up his own entomological supply business, initially in partnership with a Captain Grenopp, who

sadly died within a couple of years. Laurie continued thereafter on his own, running his business from his parents' house at 137 Gleneldon Road, Streatham [South London]. The back room of the house was his office, store room and work bench in one, crammed with tremendous quantities of books, specimen boxes, cabinets and paperwork (fungus, as he aptly named it!). It was my privilege on occasions to work with Laurie at this time. Whatever he was doing—it might be stripping and repapering storeboxes, repinning and cataloguing a recently acquired collection, or packing orders for dispatch, Laurie always worked efficiently and with great humour and enjoyment. And he always insisted on the 'five minute breaks' when the biscuit tin would be unearthed from among all the shelves. He was a very traditional person, wary of new-fangled inventions such as 'Sellotape' and electronic calculators (let alone computers). Laurie had to supply all sorts of livestock, from snails (collected at night on Mitcham Common) for London Zoo, to hornets (with their stings manually removed) for film-makers at Elstree Studios. The highlight of Laurie's year was preparing for and manning his stall at the annual exhibition of the Amateur Entomologists' Society, after which Laurie would host a well earned meal for all his helpers on the day. Laurie in fact had a stall at the AES exhibition in every year except one until he died. He was also a long-time member of the British Entomological & Natural History Society.

As Laurie never drove, his many friends would also help by transporting him to see and buy equipment and collections. Two trips stand out in my memory: one to buy 100 army surplus generators for conversion to moth traps, and the other a double dash twice up and down the newly-built M1 to buy immense numbers of used storeboxes from Birmingham Museum. Laurie took all the trials and tribulations of these expeditions in his stride, confident that we would complete the journey despite breakdowns, overloading and his inability to cope with a map at more than walking pace!

Laurie used to join many of his friends on holidays throughout Britain, becoming 'Uncle Laurie' to all their families. His wide-ranging interests always added an extra dimension to holidays; he was always keen to find the 'bug of the moment' whether it be bluebottles, hoverflies, bees or lacewings. But he also had such a wide knowledge of the plants and environment around him, as well as being widely read and keen to discuss the books that he was then reading.

Laurie was a keen gardener, and he always liked to take visitors round his colourful garden, admiring not only the plants but also the cages of old bones set out to attract carrion beetles. When staying with friends, he actually enjoyed hand weeding, commenting on how different the weeds were from one garden to another.

Following the death of his parents, and his marriage to Sadie Goodson, Laurie moved in 1978 to Franciscan Road, Tooting, from where he continued his business despite increasingly poor health. From the early 1980s he and Sadie also ran a stall in Portobello Saturday market, selling books not just on natural history, but on a wide range of subjects, all of which seemed to interest Laurie. He was always alert to the needs of former customers, and I used to get little notes in the post asking if I was interested in buying any books that he thought might be of interest. Although attendance at the market became increasingly difficult in his later years, Laurie continued to trade from home when his health allowed, until his final illness. This he bore with his usual patience and good humour. He will be missed not only for the service that he provided to the entomological fraternity, but also as a friend to many who learned their first lessons in insect collecting on Mitcham Common with him. Our sympathies lie with his widow, Sadie, and his sister Janet.

MARTIN LUFF

Laurie Christie and *Atrichops crassipes* Meig.—I share many of Martin Luff's recollections of Laurie Christie, including meeting him in Watkins and Doncaster's shop up a narrow and fire-hazardous wooden staircase above a barber's shop in the Strand. I still have on my wall a photograph of a hay meadow at Holmbury St Mary, taken on one of my walks with him, often in winter, looking for snow flies *Boreus hiemalis* and other diverse creatures during our 'five minute breaks' for refreshment.

On 15.vii.1973 I motored down to Gleneldon Road to collect Laurie for a trip into Sussex. The heavens opened in a violent thunderstorm, so we spent a couple of hours nattering whilst waiting to see whether we should proceed. Conversation turned to Diptera and to larger Brachycera. We flipped through a copy of Oldroyd's Handbook for the identification of British insects and reminisced about aquatic species. We noted that *Atrichops crassipes* had not been seen since it was added to the British list from 'alders in a water-meadow near Ticehurst Road Station, Sussex'. The date was right, so we determined to rediscover *Atrichops*. A map showed that the habitat must be the R. Rother in the vicinity of Stonegate.

The R. Rother meanders across its flood plain in a rectangular channel around 2–3 m deep. The bottom is muddy, with spits of often small, flat ironstones on the inside of bends. These are partly exposed in summer, but keep damp in shadier parts. The July water depths were 30–90 cm. In winter the flow is rapid and may overflow the banks.

Crossing farmland, the bankside vegetation may be rank perennial herbs, treacherously overhanging the channel. *Atrichops* flies were not seen in these places. We found that in parts the overhanging alders and willows, with local limes and ashes, had been cleared, but that others remained, shading the stream, or were regenerating from stools. The male and female flies were sitting on and beneath overhanging leaves of regenerating lime, at a shallow place, and gregariously laying flat batches of eggs, but not adding to a common pile as *Atherix* is reputed to do. Elsewhere males were found sparsely on leaves at meadow level. Flies and photographs of them were shown at the annual exhibition. We made a further trip on 22.vii to search other streams identified from the map, but without success. In spring 1974 we sieved mud and shingle for the unknown larvae and managed to find one, distinctive for its filamentous appendages. Another visit to discover the pupation site was thwarted by high water levels and fast flows following floods.

R. W. J. UFFEN

I am sure that Martin Luff's reminiscences of Laurie Christie will bring back memories to many, of visits to Gleneldon Road. They have certainly reminded me of my own early beginnings in Entomology and his role in them. I probably acquired some of my first collecting and storage equipment from Laurie. I used to visit him at 137 Gleneldon Road while at school in Croydon and the memory of his rooms, with piles of books and papers over every surface, stays with me. It may well have been Laurie who suggested that I join the 'South London' and I frequently made the journey to South Audley Street after school. Like Laurie, I lived close to Mitcham Common and it was a favourite collecting site. At that time, in the late 1960s, I was only interested in Lepidoptera. Having spent a long time (mostly unsuccessfully) attempting to catch purple hairstreaks in the New Forest it was a revelation to be told by Laurie that they were abundant on the oaks on the common! And so they were! I hope they are still common. [Later, after abandoning amateur study of Lepidoptera for paid study of Hemiptera, I found two new species of leafhopper to Britain on elms on Mitcham Common.]

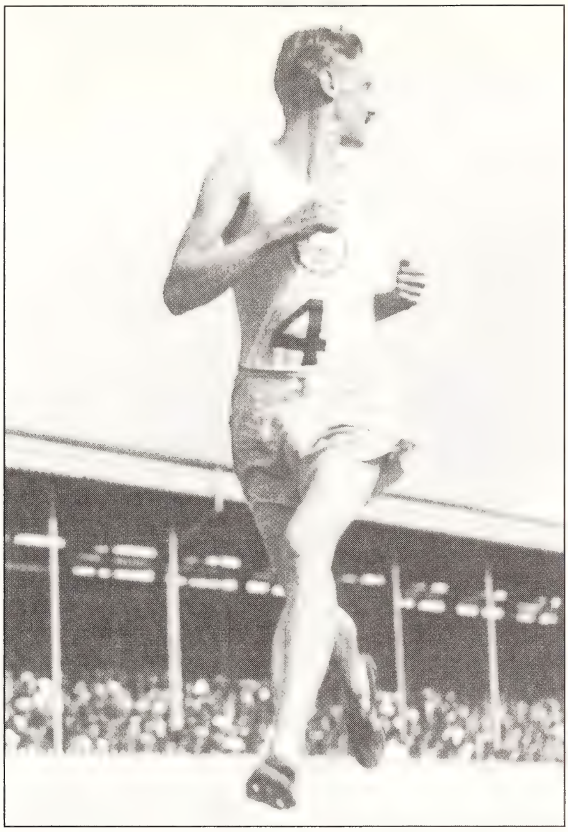
M. R. WILSON

OBITUARY

Robert Mervyn Craske, 1909–2001

Robert Mervyn Craske was born in 1909 and died on 4 May 2001. A brave and modest winner of the Military Cross, successful Empire Championship long-distance runner, and practical joker, Craske was a remarkable, utterly charming, and quirky man of military bearing who positively loved butterflies; he was also the most famous and successful variety hunter to ever live in Sussex. He was the last of the line of a family of collectors, which commenced with his great grandfather during the 1840s. Robert was an intelligent, enterprising, resourceful, and investigative collector who, after a long spell spent working for the Bank of England before the Second World War, became a peacetime dealer in antiques and thus had the time to devote to his passion. He started collecting both moths and butterflies, but from the early 1930s onwards exclusively focused on the rarest and most extreme butterfly aberrations. Renowned for his indefatigability—and as a shameless flatterer—Craske worked Shoreham Bank to exhaustion from between the wars, when he was one of the lucky few to have knowledge of the site, until into the 1990s. All of the Bank's finest forms of *coridon* (chalkhill blue) fell to his net. He was also just as successful scouring Abbot's Wood for *euphrosyne* and *selene* (pearl-bordered and small pearl-bordered

Robert Mervyn Craske: January 2001 photo: ©Richard Revels



Empire Games, Christchurch, New Zealand. March 1935. Running the 2 miles, time 9 mins 27 s.

fritillaries) during the great upsurge of small-sized fritillaries after the Second World War. Here too he obtained the most extreme melanic and ground-colour forms. The pinnacle of Craske's collecting career came in 1948 when he discovered a hitherto undescribed form of *galathea* (marbled white). After another quarter of a century's clandestine searching, sufficient specimens and information had finally been gathered for the form to be called ab. *craskei* Tubbs.

The quality and quantity of his incredible collection of personally-caught extreme aberrations—mainly taken in our county—will never be equalled again by one man in Sussex. A great, but quiet philanthropist, and utterly addicted to collecting, Craske sold (see below) this significant contribution to science to the Natural History Museum in 1970. He enjoyed a prodigious memory and an unrivalled eye for an ab. up until the end, and, even in his 92nd year, his life remained daily steeped in lepidopterological lore.

COLIN PRATT

At 91 years and five months to the day, my late father, Robert Craske had a good, long innings, and was living—and cooking for himself—at home in his Hove flat until two weeks before his death.

I spent a lot of time with him during his final fortnight, particularly encouraging him to review in his mind the many collecting grounds to which I had accompanied him scores of times as a little boy: Mitcham Common for the copper and the small heath; Tring, Ivinghoe Beacon and Shoreham for the chalkhill blue. He was, of course, an addict. A single *Captain Marvel* comic was normally purchased for me at Clapham Junction—and was expected to entertain me for the entire day!

In those days, of course, collecting grounds were jealously guarded. I remember him insisting that we hide our nets and, on occasion, lie full length on the down whenever a Lewes–Eastbourne train went by one locality, and it was always a point of honour for him to be very reticent about his success if he should meet another collector on the down. "No, very little here. Peter and I were just thinking about going!" The localities that were attached to the pins holding his insects were, too, spectacularly uninformative, usually face down (and if the inverted side was ever glimpsed, nothing much more revealing than "Guildford Dist," [in point of fact, Chiddingfold] would be gleaned) (see note below by David Carter).

I take a great deal of pleasure, not only from these childhood memories, but from the fact that I had him out on Shoreham, just this past July, in his 90th year, while I ran around and brought him anything that was moving in the grasses. I thought, perhaps the BENHS, would like this picture of him doing the "evening grasses" at the root of a down off the A283 a couple of miles north of Shoreham. I took the photo in 1964, when he was 55, younger than I am now! His trademark hat, from Locke in the West End, had a jay's feather in the band. The feather is now in my prayer book, but the hat, grease stained and battered, I dropped in on top of his

Robert Mervyn Craske, 1909–2001, below the Shoreham Downs, 1964. photo: Peter Craske

coffin in Hurstpierpoint churchyard on 11 May. It seemed, somehow, the right place for it to be.

PETER C. B. CRASKE

Robert Craske's outstanding collection of more than 5,500 British butterflies was purchased by the Cockayne Trust Fund in 1970 and was incorporated into the Rothschild Cockayne Collection, which now comprises a major part of the National Collection of British Lepidoptera at The Natural History Museum. However, the story does not stop there as, after selling his collection, Bob continued collecting and donating important new material to the Museum annually thereafter until his collecting activities slowed down just a few years ago. Indeed, not only was he a welcome and regular visitor to the Lepidoptera collection at the Museum, he was also one of its staunchest supporters and was instrumental in the acquisition of a number of important collections made by leading British amateur collectors.

It was my privilege to know Bob for a period of almost thirty years and I found him to be a charming and courteous character—sadly one of the last of the 'old school' of butterfly hunters. He was always willing to share his immense knowledge of variation in British butterflies and was even prepared to divulge his secret localities of many of his most treasured specimens, providing that the information was archived and only made available to bona fide researchers. A collection of his most important notes and correspondence will be lodged in the Manuscript Collection of the Entomology Library at The Natural History Museum.

DAVID CARTER

With Bob Craske's passing, at the age of 91, British Entomology has lost an outstanding figure. His friends will miss a character of the highest integrity, charm and vivid personality.

His great passion in life was the aberrations of British Butterflies, which he studied and collected with a success probably never surpassed. Only his friends from a previous generation, L.W. Newman and Sidney Castle Russell, and his contemporary, John Marcon, might have run him close. He had a rare 'feel' for the subject, almost an intuition, of the kind that separates the exceptional practitioner from the average in so many endeavours. It arose from a highly analytical mind applied to his chosen subject with a rare intensity. However in more recent times his achievements were, perhaps, not as widely appreciated as they deserved. This is because his major activities belonged to what was, effectively, another era. He felt that the mid to late 1960s really signalled the end of the 'old days' of reliably large butterfly populations which could be studied for variation with enough success to repay the time invested.

The only consistent element of luck in his entomological career was in its timing. He began his serious collecting, with his older brother Jack, in the halcyon days of the late 1920s, inspired by Dr Gifford Nash, one of the 'Royston Heath set' of chalk hill blue enthusiasts. Although Bob just missed the great years for aberrations at Royston, butterflies then were so abundant that it scarcely mattered. He recalled a day working the species with Jack on Ivinghoe Beacon in the early 1930s when they teemed in uncountable thousands over miles of downland. 'We were inexperienced,' he said. 'We saw some pale clouded yellows and wasted several hours chasing them. Then in the evening we just went home!' At that point in the story Bob would snort

derisively at his own behaviour. The inference was that they should have continued to work the 'blues' into the evening as they roosted in the grass, not leaving until it was too dark to see. Anything half-hearted was anathema to his nature. Nevertheless the brothers managed to capture three aberrations of sufficient quality to be included in Bright and Leeds' monograph on the subject.

Many collectors tended to 'play safe' and concentrated on working the blues in a few well-known locations such as Shoreham, Folkestone, Worth Matravers and some of the Wiltshire downs. Bob, too, visited these places to find the particular colour forms for which they were famous. But he was fiercely independent and more often preferred to strike out on his own, or with his brother, to find new locations away from the crowd. He would quote a line from the Army Training Manual: 'Time spent on reconnaissance is rarely wasted.' For many years the brothers' expeditions were undertaken entirely by bicycle—they must have cycled many long, dark hours. However, the strategy paid off and Bob eventually put together the finest ever self-taken series of the species.

His other favourites were the small and pearl bordered fritillaries. He and Jack worked these for many years in the Surrey/Sussex woods, where they had incomparable success with melanics and other rare forms. They might secure 5 or 6 extreme aberrations in a single day. This owed little to random luck; an attribute, one suspects, that Bob felt was largely for the dilettante. He made his own good fortune through careful preparation and long hours in the field.

He had magnificent series of aberrations in many other species, including a range of gynandromorphs, colour forms, numerous striated, radiated and obsolete forms of various species of blue and the small copper, many melanics, albinos and extreme forms of homoeosis. Indeed the only real 'gap' was one of his own choosing. He didn't work the larger fritillaries because he felt the appearance of their aberrations too capricious to be worth his time. However it says much that when his great friend John Marcon told him of the precise area in the Surrey/Sussex woods where he was having regular success with aberrations of the silver washed fritillary, Bob decided not to go there. 'It was Marcon's location' he said. 'So I left him to it'.

Bob was so much more than a 'collector' in the traditional sense. His conversation would be littered with acute and original observations on distribution and behaviour. His was an intellect that always asked why, and in his approach to his favourite subject he was ahead of his time.

Although selective breeding was not for him (perhaps the rise of genetics came too late in his career), he took a great interest in the results of others' work, such as his friends Alan Collier, Ralph Tubbs and Richard Revels. Sometimes he would supply them with a living butterfly aberration to breed from or he would point them towards some secret location where they might find a rare form for themselves.

In other ways his own studies highlighted aspects of butterfly biology and physiology. His note-taking and research were so precise that he was, for example, able to state the precise position, in various woodlands, where he and Jack captured every one of their small fritillary aberrations. They were all on the lowest contour line of their locations, allowing Bob to suggest, with confidence, that they occurred as a result of frost acting on the newly-formed pupa. Undoubtedly he was right.

He carried out his own 'mark and release' studies on local movements in the orange tip, thereby satisfying himself, long before such work was in vogue, that the male is not territorial but may wander considerable distances searching for females.

He used his own, doubtless very accurate, counting method to assess the yearly populations of Chalk Hill Blues at Shoreham. This began in the 1930s and continued unbroken for well over 50 years (during the Second World War Gus Stafford was

pressed into service in his place). The result is a fascinating, and unique, record demonstrating the sheer scale of the 'boom and crash' dynamic of the population.

It was a surprise to some that he passed his immaculate collection of 6000 butterflies to the Natural History Museum in 1970; every capture a combination of endless thought and tireless effort. However he said he never missed it. There was an intellectual pleasure in the moment of capture which was, for him, the defining moment of his passion. 'I don't need a collection' he would say. 'If I want to see my butterflies I can always go to the Museum.' He was proud that his own efforts should have become part of the National Collection. 'It will let people see what used to be possible,' he said, probably being more aware than anyone of the great changes in the countryside and in butterfly populations since the Second World War.

Bob was marvellous company. His intellect was sharp, his opinions vigorous, his energy and enthusiasm seemingly boundless and his sense of humour quick; sometimes wicked, sometimes a little eccentric. His charm was spontaneous and generous—one's own rather lesser achievements and knowledge became somehow magnified in his presence. He was a delightfully rounded character whose conversation would range effortlessly across such diverse subjects as ornithology and cricket, the history of steam trains and the politics of the Second World War, Charles Darwin's journey on '*The Beagle*' and, of course, his beloved entomology in all its shades. Time spent with him was stimulating, challenging, sometimes provocative and always filled with laughter.

One of his most remarkable traits was a 'photographic memory'. He used to say, of his career in banking before the War, 'They just locked me in a small room and fed me questions. I could remember everything!' Incidents from any time in his life were remembered with unerring accuracy. Mention of a butterfly captured in the 1930s would prompt a date, location and nearest contour line, and then comparison with other specimens, all with full data. This extended far beyond his own experiences—he seemed to carry the entire history of the subject in his head and it was a faculty completely undimmed by age. Unfortunately for posterity he was a modest man and when it was suggested that he might write a record of his experiences, as John Marcon had done some years before, Bob said 'Oh no. I don't think anyone would be interested'. For once he was mistaken.

He knew all the major figures in amateur entomology over most of the last century and had a gift for instant epithet. There was his close friend Major General Kit Lipscomb: '*A very brave man*'; Sidney Castle Russell: '*Perhaps the most delightful old gentleman I ever met*'; Austin Richardson: '*Hopeless headmaster—spent all his time collecting moths!*' L.W. Newman: '*Absolutely straight*'; G.F.C.Woollett: '*Enormously fat; a dear chap*'; E.A. Cockayne: '*He was THE man on moths*'; Nigel Pilleau: '*Cycled from Horsham to Folkestone, caught an albino Small Copper and cycled all the way home again*'.

Bob told his stories well and his tale of collecting with General Lipscomb on Whixall Moss was a favourite. After a morning looking for ab. *cockaynei* of the large heath, Bob was ready for a quick sandwich. The General was not and, from the back of an average-sized car, produced tables and chairs, the scale of which apparently challenged physical law. There was a table cloth, cutlery, wine and a lunch of several courses—in the middle of the bog. Bob delighted in the surreal touch that they were apparently harassed throughout the meal by a very large and aggressive chicken. The entire day was spent, at The General's insistence, on the most difficult terrain of the whole bog, where regular falls and soakings were assured. 'The butterfly was just as common on the drier ground, but the thing was', Bob would chuckle, 'you couldn't tell him anything. He'd just pull rank!'

Talking with Bob was to experience times and events which today seem very distant, yet he brought them to life with wit, insight and uncommon detail. He would describe being driven off the hills near Tring by rain and spending hours at Lord Rothschild's private museum discussing the genetics of magpie moth varieties with a chain-smoking E.A.Cockayne. He could suddenly say, of Douglas Jardine, the infamous captain of England's cricket team during the dramatic 'Bodyline' series against Australia in 1932–3, 'I saw him play. He was a very fine batsman.'

Really, one could go on and on . . . the urge is great because the memories are so many and so precious. How we shall miss those sharp eyes, the energy, humour and wisdom. Then there was the loud voice and a memorable occasion when the volume rose in indignation and boomed across a surprised Brighton restaurant during a discussion on the extinct New Forest burnet, and its rediscovery on a Scottish Island: 'He's not the same at all' (moths were always 'he'). 'He's got a great hairy body.'

In the words of a friend, Robert Craske was 'a very grand old man'. His friendship was our privilege. We extend our sympathy to his son Peter and his family in their loss.

RUPERT BARRINGTON

BOOK REVIEWS/CD-ROM REVIEWS

British soldierflies and their allies. An illustrated guide to their identification and ecology. A.E. Stubbs and M. Drake. 2001. British Entomological and Natural History Society, Reading. Pp 1–512, 31 plates (20 colour), many figures; £30.00 (£20.00 to BENHS members).

Alan Stubbs' previous book, British Hoverflies (Syrphidae), with Stephen Falk, set a high standard as an identification guide and British Soldierflies has broadly similar aims. The present work covers the British species of the families Acroceridae, Asilidae, Athericidae, Bombyliidae, Rhagionidae, Scenopinidae, Stratiomyidae, Tabanidae, Therevidae, Xylomyidae and Xylophagidae. These families are the subject of the Larger Brachycera Recording Scheme and are the logical next choice for a semi-popular identification work on larger Diptera. Despite the number of families it actually covers fewer species (162) than British Hoverflies (256), but in a more comprehensive format. It contains keys to adults and most early stages and extensive accounts of the biology of each family.

The book starts with an introduction followed by a chapter on observing, collecting and recording (including photography and conservation). Chapter 3 covers habitats and seasonality. Chapter 4 concerns the early stages in general, followed by chapter 5 with keys to larvae and pupae. These keys are understandably incomplete, but represent an enormous advance in coverage of the early stages of the families concerned. The authors stress that some species are unknown in the early stage and in some the characters used may prove to be variable. Little information is available on the eggs of the families and no keys are provided. Chapter 6 is an introduction to the adult stage. Chapter 7 consists of keys to adults of all families to species level. The next 11 chapters are accounts of each family, including sections on their biology, ecology and distribution, observing and collecting techniques. Each of these chapters ends with a description of the fauna and it is this last section which includes the detailed information on each species. Chapter 19 provides a check list of species covered and information on the family classification. The family classification of these

families at world level has been disputed for many years and the book wisely gives the current situation without details of the more controversial proposals. Chapter 20 contains references to lists of species of the families from certain areas of Britain. Since many of the families have been collected thoroughly over the last two centuries, these lists are quite comprehensive and provide an introduction for workers surveying specific regions. Chapter 21 includes a general glossary and a list of plant names. The latter gives the scientific names for the common names of plants in the text. The last section of the book contains the 12 black and white plates of genitalia and abdominal patterns and 20 colour plates showing photographs of specimens.

British Hoverflies included a fine series of colour plates by Stephen Falk, while the present volume has colour photographs by David Wilson. Although colour illustrations are usually better than photographs, because the artist can enhance certain characters and eliminate differences in orientation etc, in this volume the photographs are of a very high quality and greatly facilitate the use of the keys. The keys are placed together in one section of the book and have small drawings beside the relevant couplets, as in British Hoverflies. They have been exhaustively tested and are simple to use. The authors' of scientific names are not included in the keys but are in the species accounts in the family chapters. It would have been useful to place the name of the author of each species, with or without parentheses as appropriate, in the key. Many workers will use the book to generate species lists, which should include this information. There is useful redundancy in the process of identification. Each family is keyed out and, in addition, a list of family characters is given in the description of the fauna in the family accounts. Almost all species are illustrated and short notes are given in the species accounts. This will help beginners to gain confidence in their identifications; earlier keys like Oldroyd's Royal Entomological Society Handbook relied on fewer characters. After the publication of British Hoverflies there was a spate of new species to Britain and we can expect the same from Soldierflies and their allies. Some segregates have been included in the book without names, because of taxonomic problems or because they are known only from larvae. Any such work will generate unidentifiable segregates and this is a reflection on the amount of work which has been put into the group.

All the families and species covered have been given common (English) names. This is controversial, since some workers, including this writer, consider such names unnecessary and possibly confusing. The main advantage to common names is that they open the subject to people who are put off by long scientific (Latin) names. But anyone taking up Diptera (or any other group of insects) must learn the terminology of insect parts, a much more demanding task than the scientific names. Common names are not subject to rules and may mean different species in different regions (for example the European and American robin). Scientific names are fixed by international agreement and mean the same to any entomologist.

The hoverflies which were the subject of British Hoverflies all belong to the family Syrphidae, while the 11 families in this book are a far more heterogenous assemblage. They have varied and, in some cases, very highly specialised life histories. The very detailed account of the biology of all families also serves to illustrate the gaps in knowledge and dipterists should be able to usefully direct their attention to these areas.

This book is important and timely in its emphasis on conservation. It does not contain listings of conservation categories since these are under review, using the changed 1994 IUCN guidelines. The group contains one of the highest proportions of species of conservation concern known. This is partly because many species live in wetland, a habitat which is particularly threatened at present. Further information, particularly more extensive mapping, is needed to quantify the decline of species and suggest remedies.

Alan Stubbs and Martin Drake have provided an excellent volume on a difficult area within the Diptera. It will encourage many more dipterists to take up the group and address some of the many problems which remain to be solved.

JOHN ISMAY

CD-ROM REVIEW

Lepibase 2.0 Butterflies of Europe. CD-ROM. 1999. Winlab Oy, ISBN 951-98192-1-5. A. Roine, Tuttulantie 4, FIN-28450 Vanha-Ulvila, Finland. E-mail: antti.roine@saunalahti.fi

This excellent CD operates with Windows 95, 98 or NT, and should run on most modern PCs. The disc is presented in a book-style box which contains nothing but the disc in a crystal case and basic installation instructions. Installation is simple and use of the CD is fairly intuitive, although a detailed on-screen 'manual' is supplied and it is well worth printing this out for closer study, as only then does the full capability of the software become apparent.

The disc covers 491 species and 35 European countries with more than 2000 colour photographs. A novel feature is the facility to select a country whereupon only those species that occur there will be listed. This can be a great aid to identification as it will often limit the number of similar-looking species that need to be considered. The simple text for each species includes details of habitat, range, behaviour and hostplants. Distribution is indicated by large drop-down maps of Europe and North Africa, with ranges shown in black. There is a choice of colour maps or simple outline maps with coastlines and country borders, the latter showing distributions much more clearly. A very useful feature is that moving the cursor onto any point of the map will indicate the exact longitude and latitude.

Each species is illustrated by photographs of male and female uppersides and undersides (quaintly referred to as 'bottoms'), in some cases supplemented by field photos of live butterflies and caterpillars and, in a few instances, with habitat photos. The data for each photograph are supplied. The filed shots are almost entirely of northern European species, no doubt reflecting the fact that the author lives in Finland. Quality of the photographs is generally good and most can be enlarged to full screen size. Personally, I find this too large to be useful but it is a facility that some might appreciate. It is possible to print photographs if required. As a further aid to identification, the comparison operation mode shows upperside and undersides of male and female on the screen at the same time and it is also possible to select up to four different species to be viewed together. The greatest shortcoming is the lack of sufficient photographs to deal with variation. For example, for such a variable species as *Melitaea didyma*, only one male and one female is illustrated, making identification almost impossible unless the particular form illustrated is found.

What makes this software so much better than any normal identification guide is the facility to add one's own data, either in the form of text, maps or pictures. It is even possible, using 'group selection', to create lists for other groups of Lepidoptera, to which can be added photos and other data. There is also a facility for creating and printing one's own data labels.

This well-thought-out package is good value for money and will provide an exceptionally useful tool for lepidopterists. The author accepts that there may still be some errors and bugs and asks for comments and contributions of photographs to improve subsequent versions—a good prospect for the future, but do not hesitate, the current version is well worth buying.

DAVID CARTER

Editorial

WHERE ARE THE LEPIDOPTERA PAPERS?

Occasionally I receive comments that the current content of the Journal does not reflect the overwhelming interests of the membership—the British Lepidoptera. [Incidentally these views are usually passed to me by a third party and I can't remember ever having such comments directly]. Looking at the current contents over the past year I can only agree that there does not seem to be much for the Lepidopterist! The solution is simple. I can only publish what I receive and I am offered very few Lepidoptera papers. When I look at the content of some other British entomological journals (especially those who seem to place more emphasis on Lepidoptera) I see plenty of familiar names, many of whom are members of this Society. Is it that our Journal is not considered to be a good place to publish on British Lepidoptera? Or perhaps it is that if someone has a contribution they wish to place it where most others interested in the work would see it? I would be interested to hear why Lepidoptera papers seem under-represented in the Journal. I would be just as keen to receive some manuscripts!

MIKE WILSON

Is anyone interested in fieldwork in Slovenia in summer 2002?

Slovenia is a small country with a wide range of habitats, ranging from alpine meadows, the eastern part of the Alps, the Panonian lowland, to marshes, wetlands, and limestone karst grasslands and forest. Only coastal habitats are limited.

Contacts with the Slovenian Museum of Natural History can facilitate joint fieldwork between BENHS members and Slovenian entomologists in summer 2002. A week in either of late May to July could be chosen.

Travel to Slovenia is easy, either directly to Lublanja or via Trieste (around £120 return from Stansted in 2001) or to Vienna and then a train. Costs within Slovenia are modest.

If anyone is interested in extending their knowledge of European insects this would be a good opportunity of visiting a range of localities and habitats.

Please contact Mike Wilson (address inside cover; email *mike.wilson@nmgw.ac.uk*) as soon as possible. It would be helpful to have an idea of the period that is preferred and the insect groups of interest.

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